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Natural Resources of

UTAH

Prepared by the - United States Department of the Interior - Stewart L. Udall, Secretary

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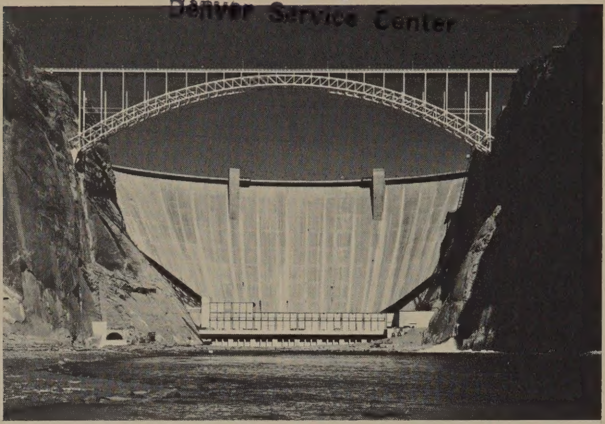
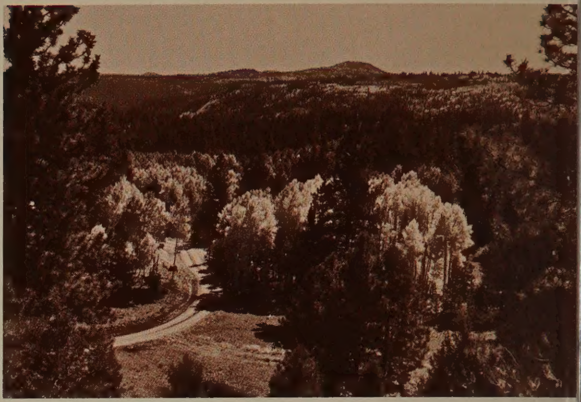
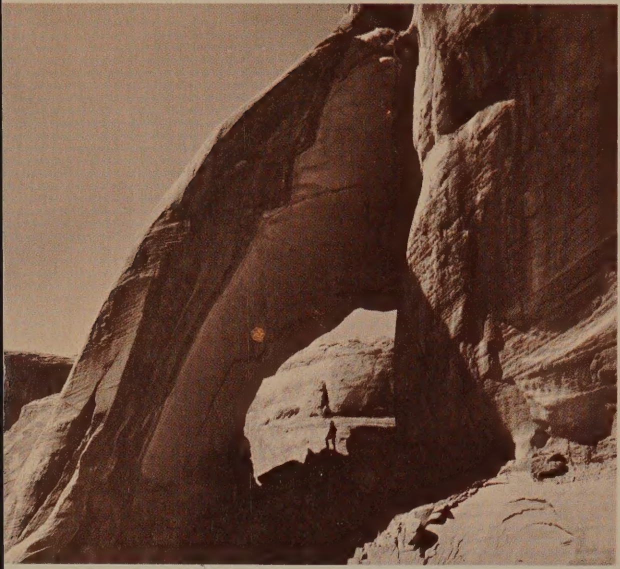
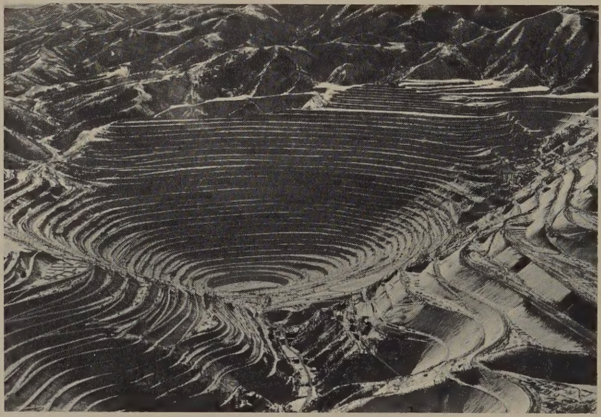






Utah, "The Beehive State"



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Natural Resources of Utah

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The purpose of this booklet is to bring a new awareness on the part of the American people of our rich natural resource heritage, its history, its present, and its future. To know our land is to love it and cherish it and protect it from the ravages both of nature and man.

Stewart L Udall

Secretary of the Interior.

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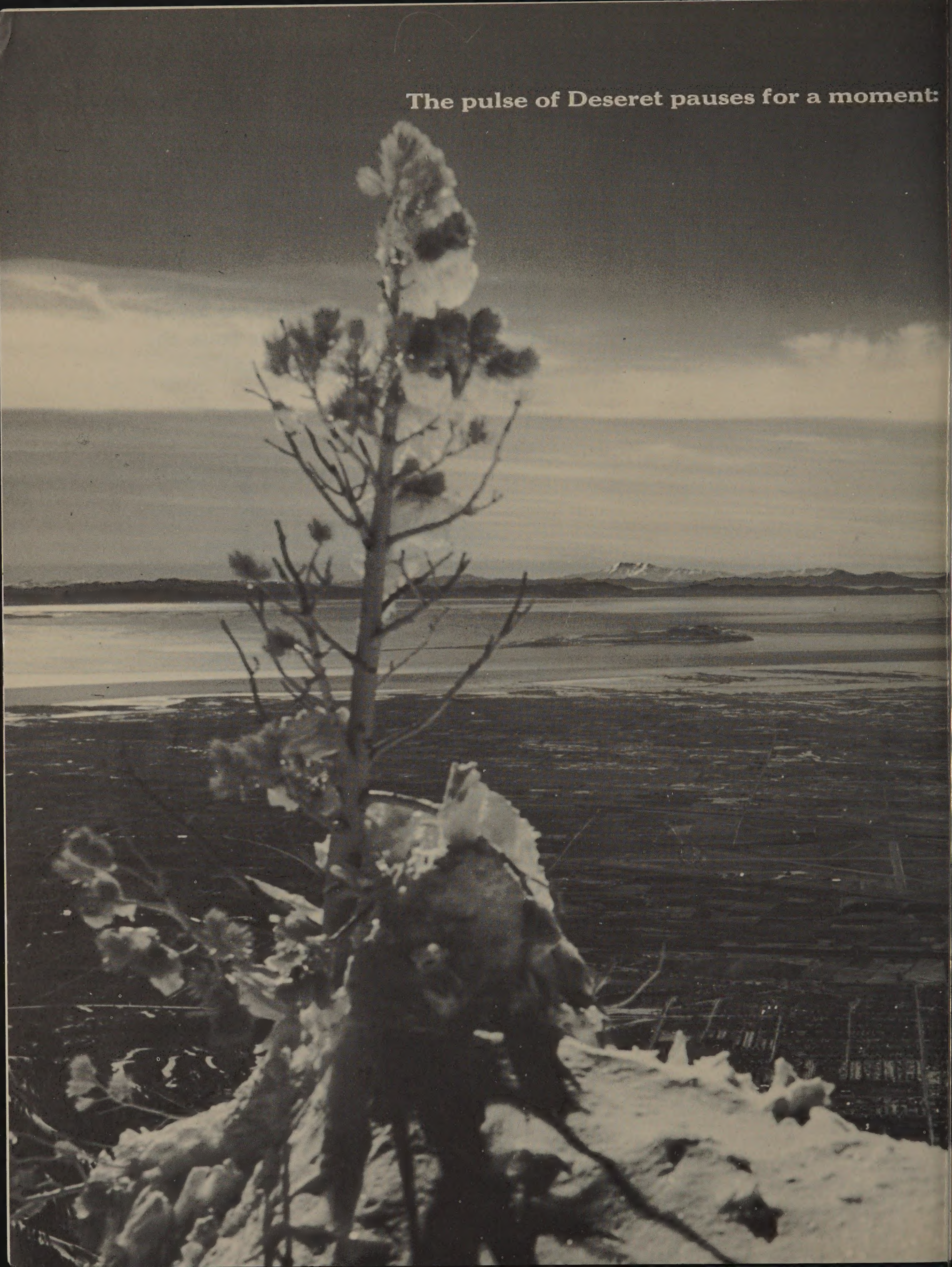
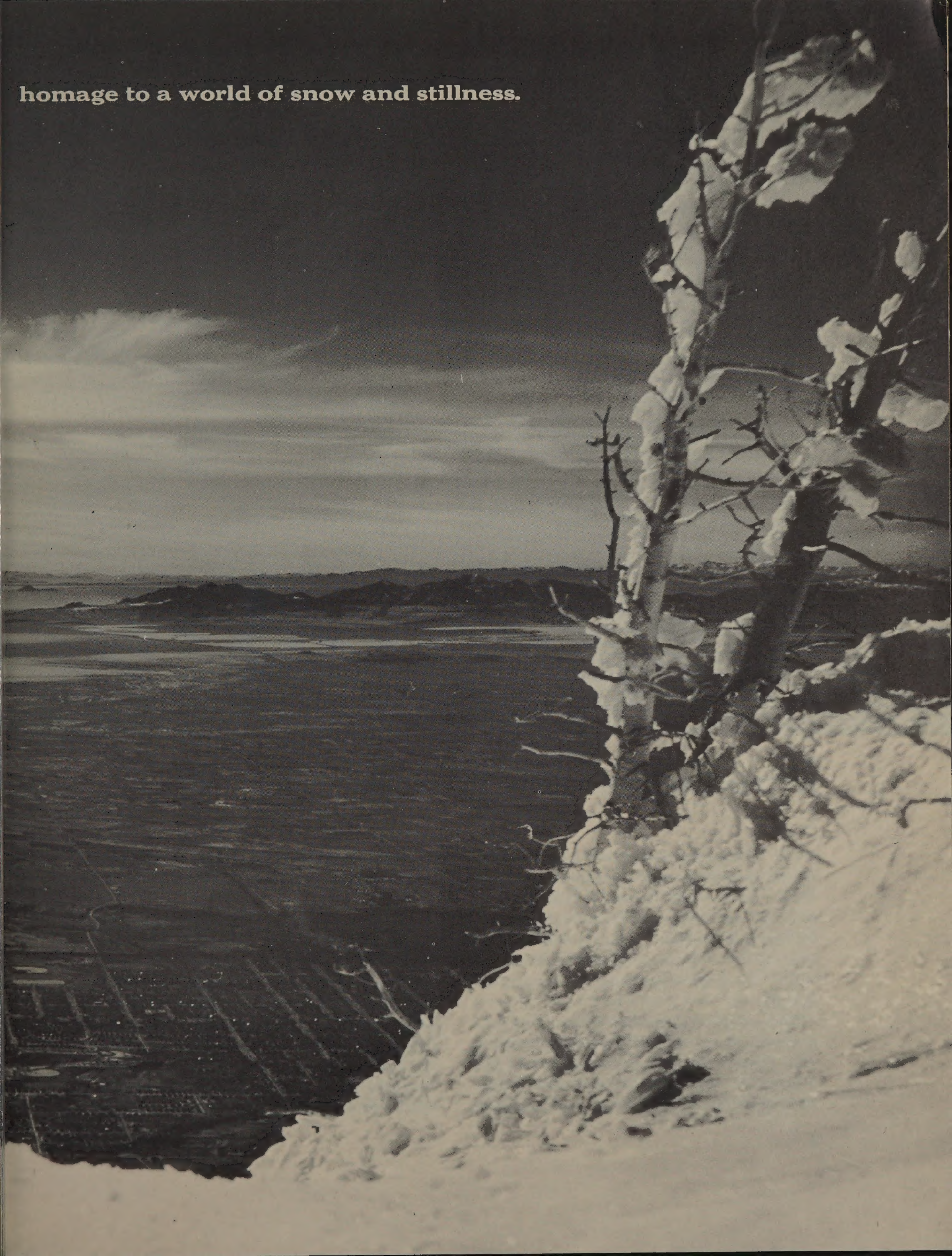

The pulse of Deseret pauses for a moment:

homage to a world of snow and stillness.



Introduction and History

Utah is a panorama of peaked mountains, lush valleys, wind-swept rock, tortuous canyons, and desolate deserts. Into this once forbidding wilderness came some of the most incredible characters in the history of the West. Stories of these men and their experiences in taming the land make the history of Utah an epic of hardship, determination, and triumph.

The 13 eastern colonies had declared their independence and were organizing a united government when explorers were just discovering the land that is now Utah. The first recorded expedition to enter Utah was that of Fathers Escalante and Domingues, two Franciscan priests, who left Santa Fe, N. Mex., in July of 1776 in search of a direct route to Monterey, Calif.

Venturesome Spaniards may have reached the southeast part of the State before 1776, but it was the Escalante expedition which first made Europeans aware of the region. The explorers entered northeastern Utah east of Jensen, discovering Green River, and then traveled westward to Utah Valley. They spent three days with the Indians before turning southward, but never saw the Great Salt Lake. After this expedition came numerous Spanish caravans which traded with the Indians of the Great

In beautiful settings like this, Utah's first settlers built their ranches and farms and started a new life.

Prehistoric Indians carved these pectographs near Bryce Canyon long before the white man stepped foot in Utah.

These primitive furnaces and ovens stand as monuments to the faith and courage of Utah's pioneer ironmakers.

Basin. The route of these trading parties became known as "The Old Spanish Trail."

Opening the Region

It was not Spanish travel in the south but rather British and American enterprise in the north which opened the Utah region. Utah's unexplored wilderness attracted the trapper and trader, who made contact with the Indians and started a profitable fur trade. Much of the geography of present-day Utah became known soon after these fur trappers entered the area. Two American trappers, James Bridger and Etienne Provost, independently discovered the Great Salt Lake in 1824 while searching for beaver. Two years later, Jedediah S. Smith crossed Utah on his way to southern California in what turned out to be an American's first overland journey through the region. In his return to Utah the following year, he traveled eastward through the Sierra Mountains and central Nevade deserts, proving that a white man could make the treacherous journey. Smith became the first American to cross Utah both from north to south and from west to east.

Utah's first white settlement is said to have been established by a trapper, Antoine Robidoux. As early as 1832, Robidoux established a post in the Uintah Basin near the confluence of the Uintah and Duchesne Rivers. Five years later, Philip Thompson and David Craig built "Fort Davy Crockett" at Browns Hole. Fort Buenaventura was built by Miles Goodyear in the Weber River Valley at present-day Ogden. During the same period, other explorers and emigrants crossed Utah, leaving a legacy of letters and records which later pioneers used in establishing permanent settlements.

Other fabled men of the trapping period were William L. Ashley, William L. Sublette, and Peter Skene Ogden. They brought back to the east stories as well as pelts and aroused considerable interest in the new area. Many of Utah's cities and natural features are named after these early trappers whose tales and discoveries contributed to the opening of this section of the West. However, by 1840 the fur trade was doomed, for silk hats had caught the fashion and the demand for beaver ended. But interest in Utah was already being stimulated by another kind of venture.

The first serious scientific explorations in the uncharted West were conducted by Captain B. L. E. Bonneville and Captain John C. Fremont. Bonneville himself did not enter Utah, although some of his men, led by Joseph Walker, explored the north end of the Great Salt Lake region in 1833. Walker's route from the Great Salt Lake to the Pacific Coast became the one over which thousands of gold seekers journeyed to California. Later, the first transcontinental railroad followed part of the route.

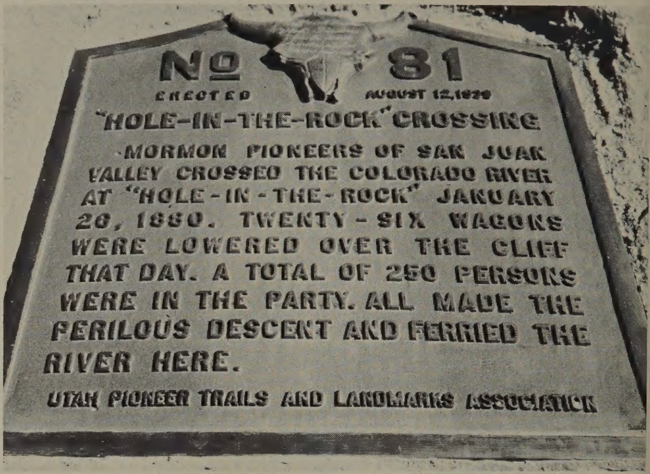
Fremont's expeditions were more important, although his "discoveries" were actually explored by the earlier trappers. It was Fremont who produced scientific reports and maps of the West at a time when expanding America needed them. Four of Fremont's five expeditions for the U.S. Government entered the region that is now Utah in 1843, 1844, 1845 and 1854.

Many California-bound emigrants passed along the Spanish Trail through southern Utah during the 1830's, and several parties traveled through northern Utah before the Mormon settlers came. In 1845, Kit Carson carved a trail for Fremont across the Salt Desert to California. This trail was later followed by the ill-fated Donner party, whose expedition was a tragic chapter in the history of the West. The Donner party crossed the treacherous white desert only to be trapped by winter snows in the Sierras, where more than half of its members perished. The next year, in 1847, the first wave of the great Mormon migration from the Midwest entered Salt Lake Valley. In the light of this migration, the padres, fur trappers, explorers and Pacific migrants were only transient shadows on the land. The courage, resourcefulness, and determination of the Mormons helped to shape the destiny of Utah.

Mormon Settlement

For many, Utah is almost synonymous with Mormonism. Utah's history has been inextricably bound with that of the Mormon people (members of the Church of Jesus Christ of Latter-day Saints) for over 100 years. Brigham Young and his group, the last of the main advance party of Mormons, entered Salt Lake Valley on July 24, 1847. Other Mormons arrived during the same summer. The pioneers immediately set about to irrigate the land, plant crops, build a fort, and explore the surrounding countryside. The first laws in the region, issued

(right) The ghost town of Paria in Kane County tells a silent story of the hardships the early Mormons faced.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ERECTED
AUGUST 12,1939
"HOLE-IN-THE-ROCK" CROSSING
MORMON PIONEERS OF SAN JUAN VALLEY CROSSED THE COLORADO RIVER AT "HOLE-IN-THE-ROCK" JANUARY 26, 1880. TWENTY-SIX WAGONS WERE LOWERED OVER THE CLIFF THAT DAY. A TOTAL OF 250 PERSONS WERE IN THE PARTY. ALL MADE THE PERILOUS DESCENT AND FERRIED THE RIVER HERE.
UTAH PIONEER TRAILS AND LANDMARKS ASSOCIATION

(above) A plaque marks the place at "Hole in the Rock" where 250 Mormon settlers crossed the Colorado.

as decrees by Brigham Young on July 25, related to land ownership and resource conservation.

The first winter was mild, and in the spring of 1848 the settlers planted several thousand acres of wheat and corn. One of Utah's favorite tales comes from this time when seagulls halted a famine by destroying hordes of crickets which were devouring the pioneers' crops. The seagull later became the State bird.

In December 1848, the Mormons prepared a document—said to have been 22 feet long and bearing over 2,200 signatures—asking Congress to create a Territorial Government. But, by the time this petition was sent east in May, the Mormons had already drafted a constitution for the provisional "State of Deseret." "Deseret" was a Book of Mormon word meaning "honey bee." Brigham Young was named governor and other Mormon leaders became government officials.

The State of Deseret held its first legislative session in July, 1849. The boundaries proposed for the Deseret included virtually all of what is now Utah, Nevada, the greater part of Arizona, portions of Idaho, Wyoming, Colorado, Oregon, and New Mexico, as well as a strip of the southern California coast. In 1850, the Deseret legislature petitioned Congress for admission as a State. Although Congress didn't grant Deseret statehood, on September 9, 1850, it created the Territory of Utah, naming Young the first territorial governor. By 1851, Mormons had built settlements down the mountain valleys south from what was then called Great Salt Lake City, and a census taken by Young indicated that 11,380 persons were living in Utah. Mormons continued to arrive by the thousands and the population reached 50,000 in 1856. Before Young died in 1877, he had directed the colonization of more than 350 communities in six Western States.

Unfortunately, within a short time, Mormon religious beliefs led to great strain in territorial relations between the Saints and Federal officials. Although it has been estimated that no more than 3 percent of marriageable Mormon adults actually practiced polygamy, controversy over this aspect of Mormon life grew in the East. The Mormons denied charges that they were socially irresponsible and

The Brigham Young monument commemorates the Mormon arrival at Salt Lake Valley in the summer of 1847.

countered that Church doctrine on plural marriage actually represented a stern moral ethic. Mormon resentment was also aroused by the Federal "outsiders" on the judiciary whose actions were not always scrupulous.

The bitterness culminated in the so-called "Utah War" of 1857–58. President Buchanan terminated Young's governorship and ordered the Army of the West to put down the "Mormon rebellion." Although some guerrilla warfare occurred, a serious military showndown was averted through the mediation of Colonel Thomas L. Kane, a friend of the Mormons. In the midst of the turmoil, 30,000 Mormons began another "Move," leaving Salt Lake Valley and northern Utah to head south to Utah Valley. Other colonies of Mormons in Nevada and California were called back to Utah by Young.

The Army established a camp west of Utah Lake and remained there until the beginning of the Civil War in 1861. A detachment under Colonel Patrick E. Connor set up camp east of Salt Lake City in 1862. Connor, known as the father of Utah mining, encouraged prospecting among his troops and several important mineral deposits were discovered. He organized Utah's first mining district in 1863.

During the early 1860's, the Mormon population was in a state of ferment. Many returned to their homes in northern Utah, others continued to relocate in different parts of the region. In 1862, Congress passed an ineffectual anti-polygamy bill. With the creation of the State of Nevada and the Colorado Territory, Utah was pared down in size. A "ghost government" of Deseret was secretly established, which held sessions for 9 years in the hope that it would one day be recognized as the legal State Government. The Ute Black Hawk War, Utah's last major Indian conflict, began in 1865 and raged for three years. Finally, completion of the transcontinental railroad, marked by the meeting of Union Pacific and Central Pacific Railroads at Promontory in 1869, broke down forever the physical isolation of the Mormons and brought the pioneer era to an end. The railroad and subsequent development of Utah's mining industry brought a great influx of non-Mormons into Utah.

The controversy over polygamy flared intermittently during the 1870's and 1880's. Congress passed several anti-polygamy bills which disfranchised and imprisoned thousands of Mormons, confiscated Church property, and abolished female suffrage in Utah. Relations between Mormons and the Federal Government never became amicable

Built in a pure Corinthian style, the State Capitol at Salt Lake City is considered to be one of the finest in America.

until 1890 when Wilford Woodruff, then President of the Church, issued a manifesto advising Mormons to abstain from polygamy. Following the manifesto, polygamists were pardoned and their civil rights restored. Utah was finally admitted as the 45th State on January 4, 1896.

Utah Today

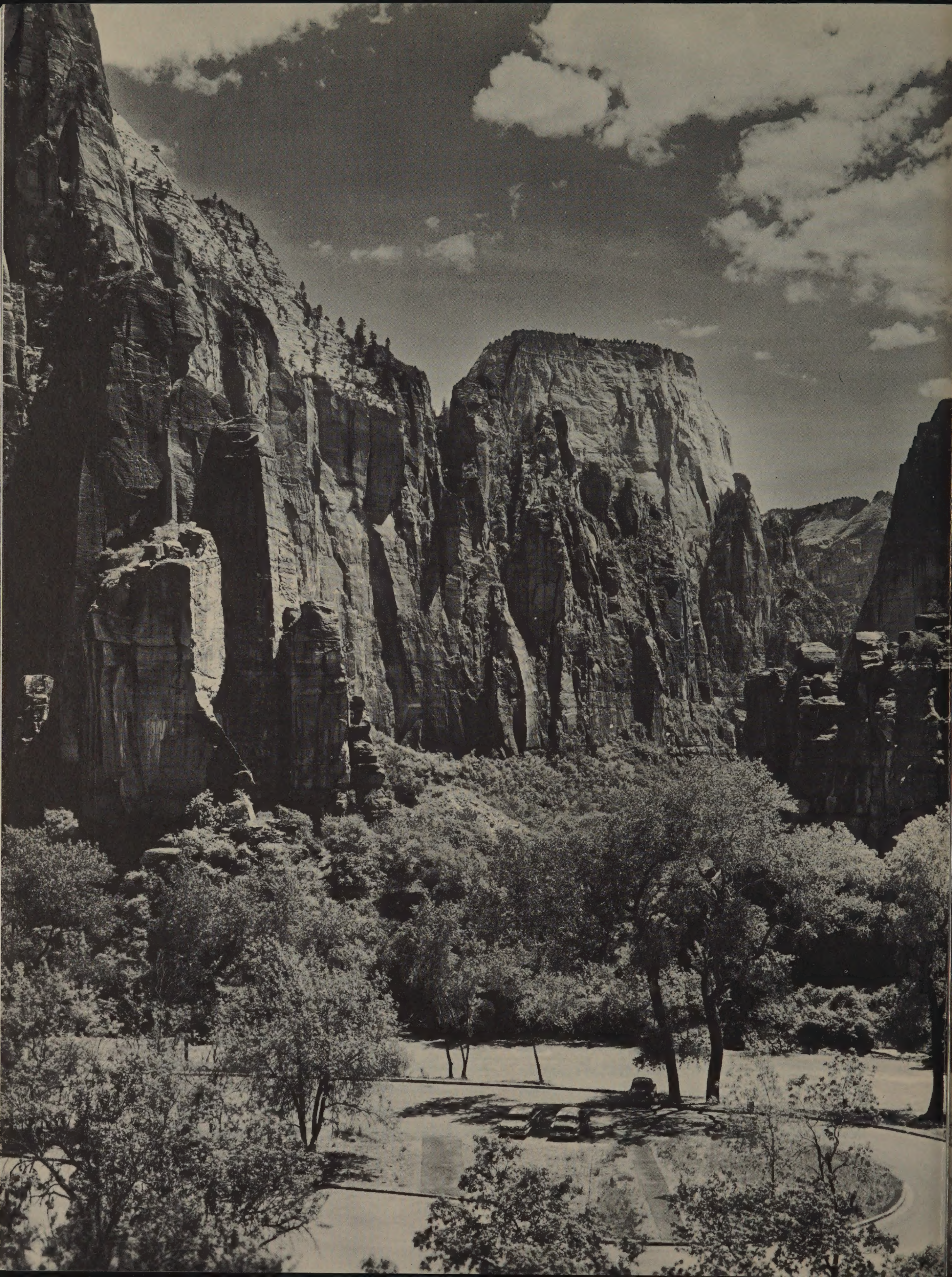
Utah today is a modern, energetic State. It ranks high in agriculture and mineral production. The combination of its geographical location, expanding population, and great wealth of natural resources make Utah ideally suited to manufacturing, the State's leading industry. Like the pioneer builders, Utahans continue to work for a growing and prosperous economy. Their efforts, past and present, are aptly represented by the State's symbol of a beehive and the motto "Industry."

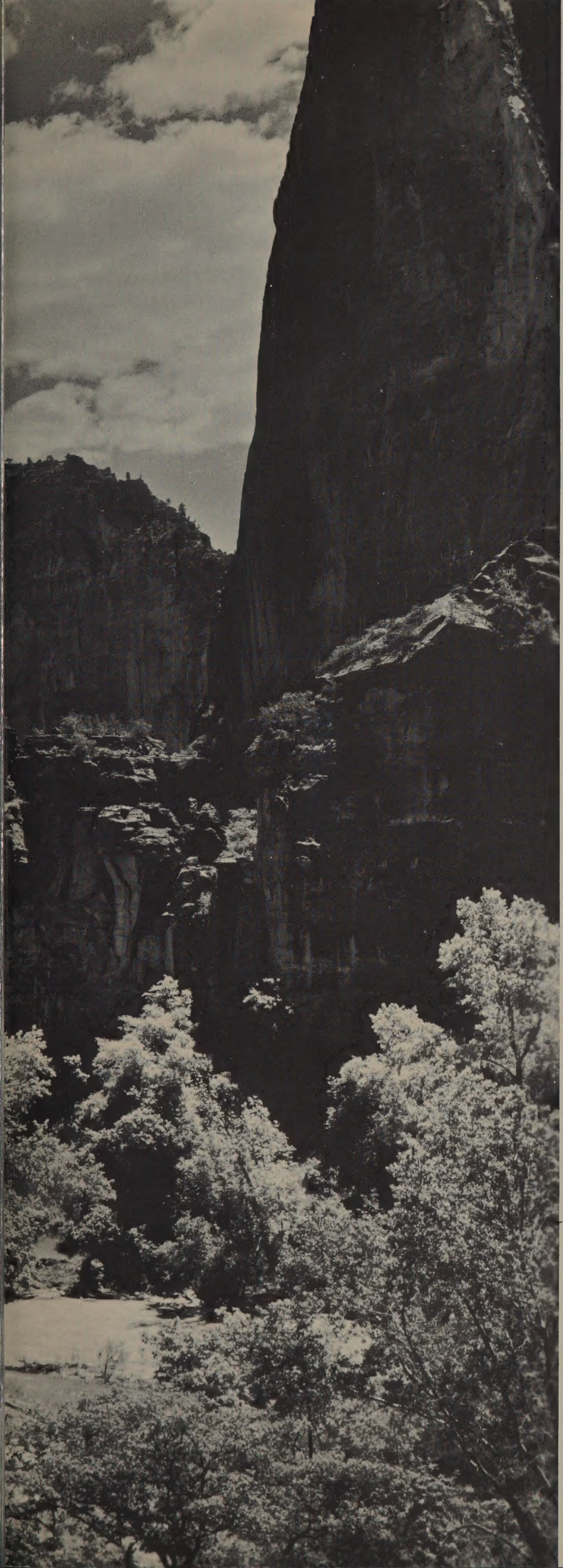
Utah's progressiveness is apparent in the technological advances of a growing mineral industry, symbolized by the huge Bingham copper mine which produces a fourth of the Nation's copper. Open-cut mining operations at Bingham started during the early 1900's, and smelters subsequently were established at Magna, Garfield, Tooele, and Murray, making Utah the largest nonferrous smelting center in the world. Recent years have also seen the boom of Utah's oil and uranium industries.

The livestock industry contributes greatly to the State's economy. Major agricultural products include wheat, alfalfa, hay, seed, potatoes, and sugar beets. The State's natural scenic beauty and the many monuments to its pioneer day have prompted an ever-increasing tourist trade.

Utah's people are vitally interested in music, art, literature and drama. The Tabernacle Organ and Mormon Tabernacle Choir are world-famed. The State has produced many prominent artists, sculptors, and writers.

With over 983,000 people, Utah ranks 38th in population among the States. The State has one of the Nation's highest birth rates and lowest death rates. Utah also boasts a higher proportion of college students than any other State. Leading universities in the State include the University of Utah at Salt Lake City, Utah State University at Logan, Weber State College at Ogden, and Brigham Young University at Provo. Utah's major cities are Salt Lake City (capital), Ogden, Provo, Logan, Orem, Bountiful, Murray, and Brigham City.





Physical Characteristics

Midway between Canada and Mexico, Utah stands near the center of the eleven Western States. The 11th largest State in the Union, it encompasses some 82,000 square miles, which includes 3,000 miles of water surface. Utah is bordered by Nevada on the west, Idaho and Wyoming to the north, Colorado to the east, and Arizona to the south. The southeastern corner of Utah touches the only point in the United States where four State boundaries meet.

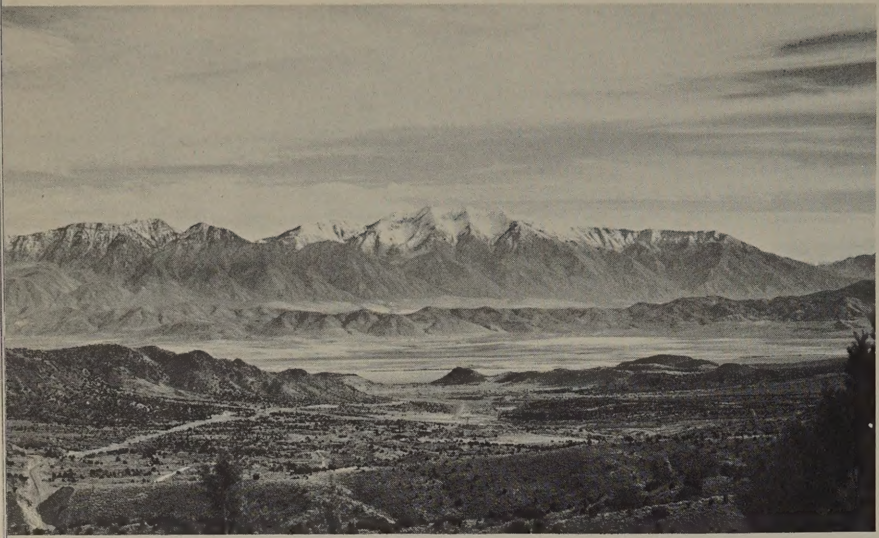
The western part of Utah lies in the Great Basin, the largest closed basin in North America. The Great Basin is characterized by internal drainage—streams which flow into the Basin have no outlet to the sea. Narrow isolated mountain ranges and sandy desert basins are typical of western Utah. The Great Salt Lake Desert lies in the northwest, and slightly east of this is famous Great Salt Lake. Approximately 50 miles wide and 75 miles long, it is the largest inland salt water body in the Western Hemisphere. With a salt content of about 25 percent, the lake never freezes.

Situated in a line slightly west of mid-State, the Wasatch Mountains and adjacent highlands to their south mark the eastern boundary of the Great Basin. Along this mountainous backbone, covered with forests, rivers, and lakes, lie the most populous regions of the State.

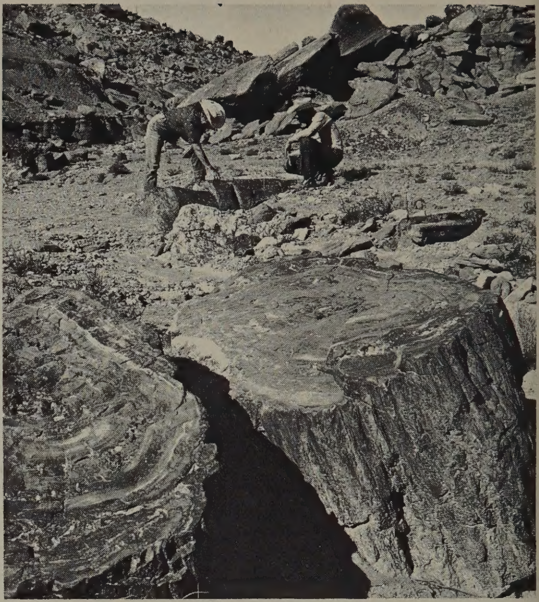
The Wasatch Mountain region receives 40 to 50 inches of precipitation annually, which includes moderately heavy snowfall in the winter. However, precipitation is generally scant in Utah, varying widely in different parts of the State. Much of western and southeastern Utah receives less than 10 inches a year, and the State average is 11.5 inches.

South of the Wasatch Range, the high Sanpitch, Pahvant, and Tushar plateaus continue, merging

The rugged shapes and stark formations of these canyon walls at Zion National Park are eloquent testimonials to the fierce and ruthless power of forces of erosion.



(above) Utah's land forms are quite varied, ranging from huge mountain ranges to rolling hills and low flatlands.



(right) These petrified logs from Blackwood Forest date back many millions of years to an ancient geologic age.

finally into a broken plateau region which extends across the Arizona boundary. The southeastern half of the State is part of the Colorado Plateau which also crosses into Colorado, New Mexico, and Arizona. This section, a region of high, flat table lands, is cut by narrow canyons and numerous valleys. Through many of these canyons run streams which flow into the Colorado River. The scenic beauty of these colorful gorges and startling geological formations in this area is preserved in parks, monuments, and recreational areas.

Above this plateau area and extending eastward from the Wasatch Range are the Uinta Mountains, Utah's second principal mountain range. The Uintas dominate northeastern Utah and include the highest point in the State, King's Peak, with an elevation of 13,948 feet.

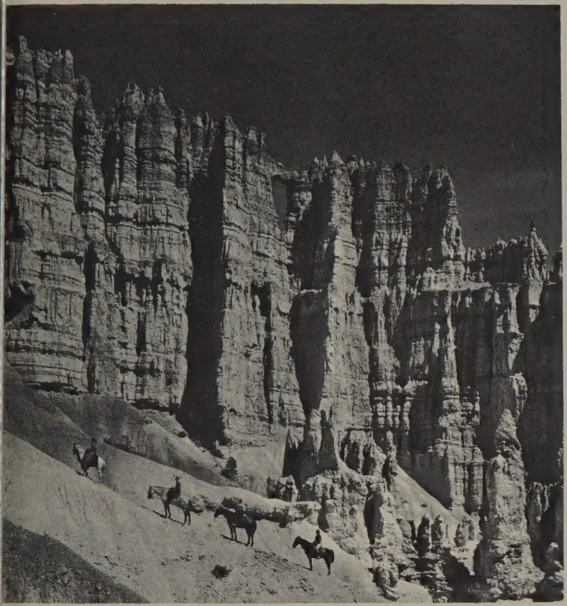
The eastern half of the State, in contrast to the western part, is drained by a continuous network of streams formed by the Green, Colorado, and San Juan Rivers, all draining eventually into the Gulf of California.

Utah's climate ranges from summer temperatures of over 100° F, which occur occasionally in nearly every part of the State, to winter lows of zero and below. Temperatures as extreme as 116° F in summer and −50° F in winter have been recorded. Daily ranges of temperature are wide, and variations up to 50° F within a 24 hour period are not uncommon. Because of the moderating effect of the Great Salt Lake, temperatures in Salt Lake City average about 77° F in July and 27° F in January.

Utah's rocks record natural events that span a billion-and-one-half years. The State's oldest rocks, today found in small and widely scattered areas, yield only a fragmentary account of early geologic history. They indicate that there was once a time when the State was submerged under ancient seas, which eventually receded. Then came an epoch when mountains were formed and huge rocks sank deep into the earth where they were recrystallized and possibly even melted. Some of these rocks, discovered east of Farmington in the Wasatch Mountains, have been estimated by radioactive dating to be about 1.6 billion years old.

A period of widespread erosion reduced the early mountain ranges to a lowland, which was finally submerged by the sea which moved in slowly from the west. During this first major epoch of subsidence, about a billion years ago, the sea reached as far east as the site of the Uinta Mountains. Sand, mud, and gravel that accumulated in this sea to a thickness of as much as five miles now form the rocks in the core of the Uinta Mountains and in small areas to the west.

A second prolonged period of submergence began



(above) Bonneville Salts Flats were formed from mineral deposits left long ago by the receding Lake Bonneville.

(left) Bryce Canyon National Park's "Wall of Windows" is visible from a trail named "Peek-a-Boo."

about 500 million years ago and continued with only minor interruptions for some 300 million years. Sandstone, shale, and fossil-bearing limestone accumulated many miles deep in the broad, deep troughs in the western half of the State. Thinner deposits to the east indicate that the seas must have spread slowly across a broad shallow shelf, eventually covering most of the State.

The 100 million years following this epoch of almost continuous submergence was the era when dinosaurs roamed the earth. During this period the region remained a lowland characterized by small swamps and large expanses of red drifting sand.

But then violent local earth movements once more raised the western half of the State above sea level. Mountains perhaps as high as the Himalayas were formed when the thick mass of limestone that had accumulated in the western troughs began to fold. Later, huge sheets of rock slid eastward from these mountains, breaking into the conglomerate of pebbles, sand, and stones that today extends northeasterly in a belt across the State. The eastern half of the State remained relatively undisturbed during this period.

About 10 or 20 million years ago, the western part of the State, by then reduced to a lowland strewn with lava and volcanic ash, fractured in a north-south direction. Some blocks rose, ultimately becoming the present mountain ranges, and others sank. Uplift of the ranges and depression of the valleys continues even today, as evidenced by the rather frequent earth tremors in the area. Erosion has stripped volcanic material and large masses of rock from many ranges, and the sediment now fills the intervening valleys in places to depths of many thousand feet.

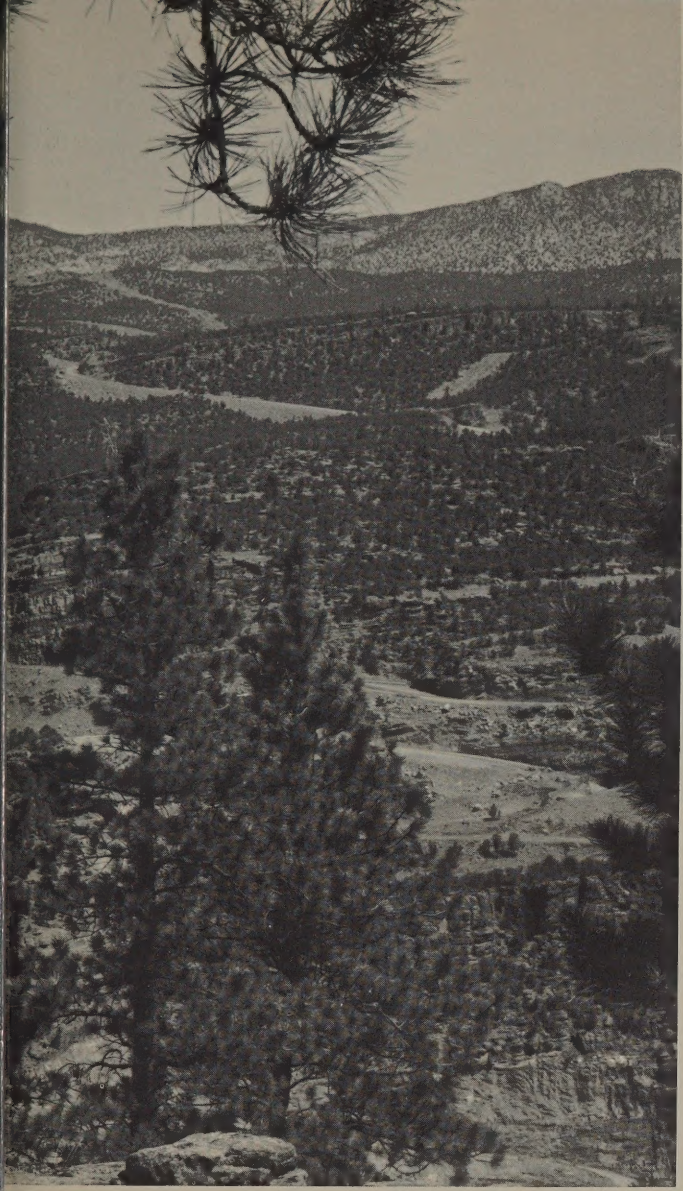
From Ice to Salt—The Great Transition

During the Ice Age which began about a million years ago, glaciers formed in the higher mountainous areas. The meltwater which accumulated in the Great Basin formed a fresh water body called Lake Bonneville. When this lake was at its largest, it submerged nearly a quarter of the State, and many present-day mountain ranges were islands in it. As the climate became warmer and drier, the glaciers receded and the lake started evaporating, eventually becoming the Great Salt Lake of today. Bonneville Salt Flats were also formed from mineral deposits left by Lake Bonneville's receding waters. The old shorelines of Lake Bonneville can now be seen as terraces along the flanks of mountains; the highest of these terraces are almost a thousand feet above the valley floors.

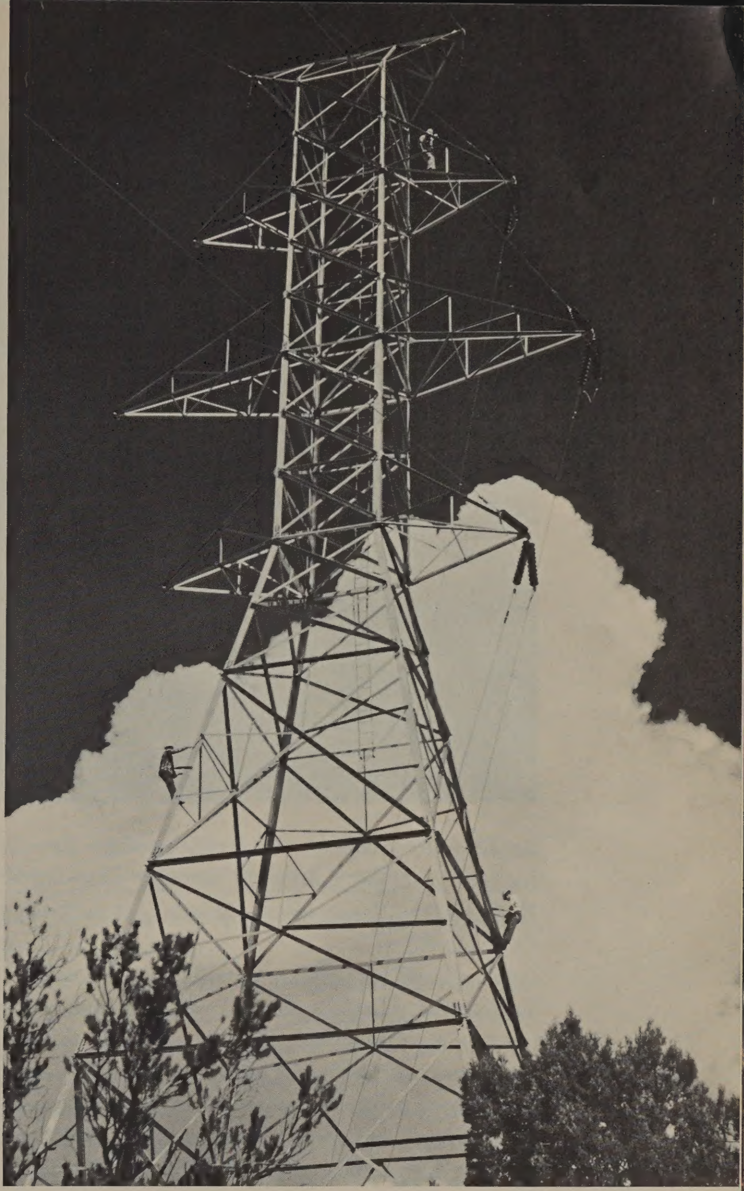
Water and Power

When Brigham Young and his hardy group of Mormon settlers reached the site of Salt Lake City in the summer of 1847, one of their first acts was to divert City Creek onto the parched earth and plant a field of potatoes. Thus, from the State's earliest history, water has been of vital concern to Utah's population. Early settlement was always tied to the streams that flowed down from the nearby mountains, and even today, population centers cluster in the well-watered regions of the Wasatch Front.

With a generally dry climate, irrigation is a necessity to keep farmlands productive. About 85 per-



Through careful management of her water resources, Utah can alleviate shortages in the drier parts of the State. Reclamation's Flaming Gorge Dam is shown.



Utah's electric power generating capacity is about one million kilowatts, bolstering its economy substantially.

cent of the State's farms, comprising nearly 1,200,000 acres, are irrigated. Considerable quantities of water are also needed each year to meet Utah's municipal and industrial needs. Although this amounts to only one-tenth of the water needed for irrigation, it is expected that by 1980 industrial needs will have increased 400 percent.

Sources of Supply

Utah's numerous rivers contain more than sufficient water to meet these growing agricultural and industrial needs. The Colorado and Green Rivers slice across southeastern Utah in deep, rugged canyons. The Bear River, rising high in the Uinta Mountains, winds back and forth across the Wyoming and Idaho boundaries five different times and terminates in the Great Salt Lake. The Weber River and its main tributary, the Ogden River, flow from the Wasatch Mountains also into the Great Salt Lake. Other major rivers in Utah include the San Juan which flows west into the Colorado; the Duchesne which flows south from the Uinta Mountains; the Jordan River flowing from Utah Lake to

Reservoirs like this, formed by Flaming Gorge Dam, are essential features of Utah's water development program.

the Great Salt Lake; the Sevier River which threads its way generally northward through west-central Utah; and the Virgin River, a tributary of the Lower Colorado River.

Where sufficient surface water is only occasionally available, a reliable source of underground water can often be obtained. Utah's principal ground water resources are in the alluvial aquifers—porous, water-bearing formations—in the Great Basin area and the regions between mountain ranges or plateaus within the Rocky Mountain and Colorado Plateaus. Using ground water for domestic, municipal, industrial, and agricultural needs frequently costs less than the effort required to obtain and treat surface water.

Despite Utah's important rivers and sources of ground water, the State still suffers from water shortages in several areas. The crux of Utah's water problem lies not in the quantity of water available in the State, but in a lack of usable water when and where it is needed. Because of uneven stream flow—not enough water in the streams at those times of the year when farms require it—and other factors, two-thirds of Utah's irrigated land needs additional water. The Weber River, for example, courses largely through habitable regions, but much of its spring flood flows from melting snow is lost in the Great Salt Lake. Water is not always available from the Colorado and Green Rivers because they follow deep canyon courses, emerging onto accessible flatland at only a few points. Ground water sources are often threatened by water-stealing plants, such as salt cedar, salt grass, and willows, which absorb quantities of water that could otherwise be used to meet irrigation and other needs. Waterlogging, when the ground water level rises high enough to kill the roots of vegetation, is a hazard in the Great Basin, especially along the eastern shore of Great Salt Lake and in lower parts of the Cache Valley. Much of the ground water in the Great Basin is also too salty for use.

Several State and Federal agencies are working in Utah to alleviate many of the difficulties involved in using its water sources. Knowledge of Utah's ground water—where it is located and how it can be most efficiently used—is gradually increasing. Recent studies of economical saline water conversion offer future possibilities for development of ground water sources in the Great Basin. The Department of the Interior's Bureau of Reclamation endeavors to conserve and develop Utah's river supplies through present and planned multi-purpose water projects. Storage dams and canals to hold flood flows have been built on the Weber River and Reclamation's Weber Basin Project, when completed, will assure beneficial use of most of the river's water. The

Sprinkler irrigation, with its similarity to rainfall and even saturation, is becoming increasingly popular.

Central Utah Project offers other possibilities for harnessing water from the Green River to meet irrigation needs.

In the next half century, with expanded population and urban and industrial growth, Utah's water needs are expected to triple. More extensive tapping of ground water sources will meet some of this demand. More intensive and complete use of surface streams presently utilized will make other water supplies available. But careful management and wise development of all of Utah's water resources will assure adequate supplies for future use.

Power for Electric Energy

A combination of sources—coal, natural gas, petroleum, and falling water—provide electrical energy for Utah, but the state's future requirements are destined to be met increasingly by tapping its abundant coal deposits to serve thermal generating plants.

The trend today strongly favors coal. Of an estimated 1,050,400 kilowatts of generating capacity in Utah's electric utilities and industrial plants, about 750,000 kilowatts are produced by coal and about 210,000 kilowatts by hydroelectric plants on rivers. Utah receives a substantial amount of hydroelectric power, much of which is generated outside of the State, from the Bureau of Reclamation's Colorado River Storage Project.

Present hydroelectric installations include the Bureau of Reclamation's Flaming Gorge Powerplant on the Green River in Daggett County with its generators now turning out 108,000 kilowatts. Proposed are plants in the initial phase of the Central Utah Project with an anticipated total capacity of 133,500 kilowatts, the 13,200-kilowatt plant in the Dixie Project on the Virgin River in southern Utah, and the largest contemplated for the State—the 400,000-kilowatt Gray Canyon hydroplant on the Green River, which would be part of the yet-to-be authorized Gray Canyon Unit of the Colorado River Storage Project.

The Federal Power Commission's recent study of hydroelectric power resources in the United States forecast that Utah has a potential ceiling of 1,300,000 kilowatts of hydropower. Engineers estimate that present and planned hydroelectric installations will realize over half of this potential while the future holds opportunities for further development. On the other hand, the State's energy requirements 60 years hence will be for 2,500,000 kilowatts. Coal for steam plants is expected to fill the gap of more than 1 million kilowatts.

Having approximately 39 million acres of largely prime rangeland, Utah ranks among the top 10 sheep-raising States. This flock of sheep is grazing in the Blue Lakes region located on the north slope of the beautiful Uinta Mountains.

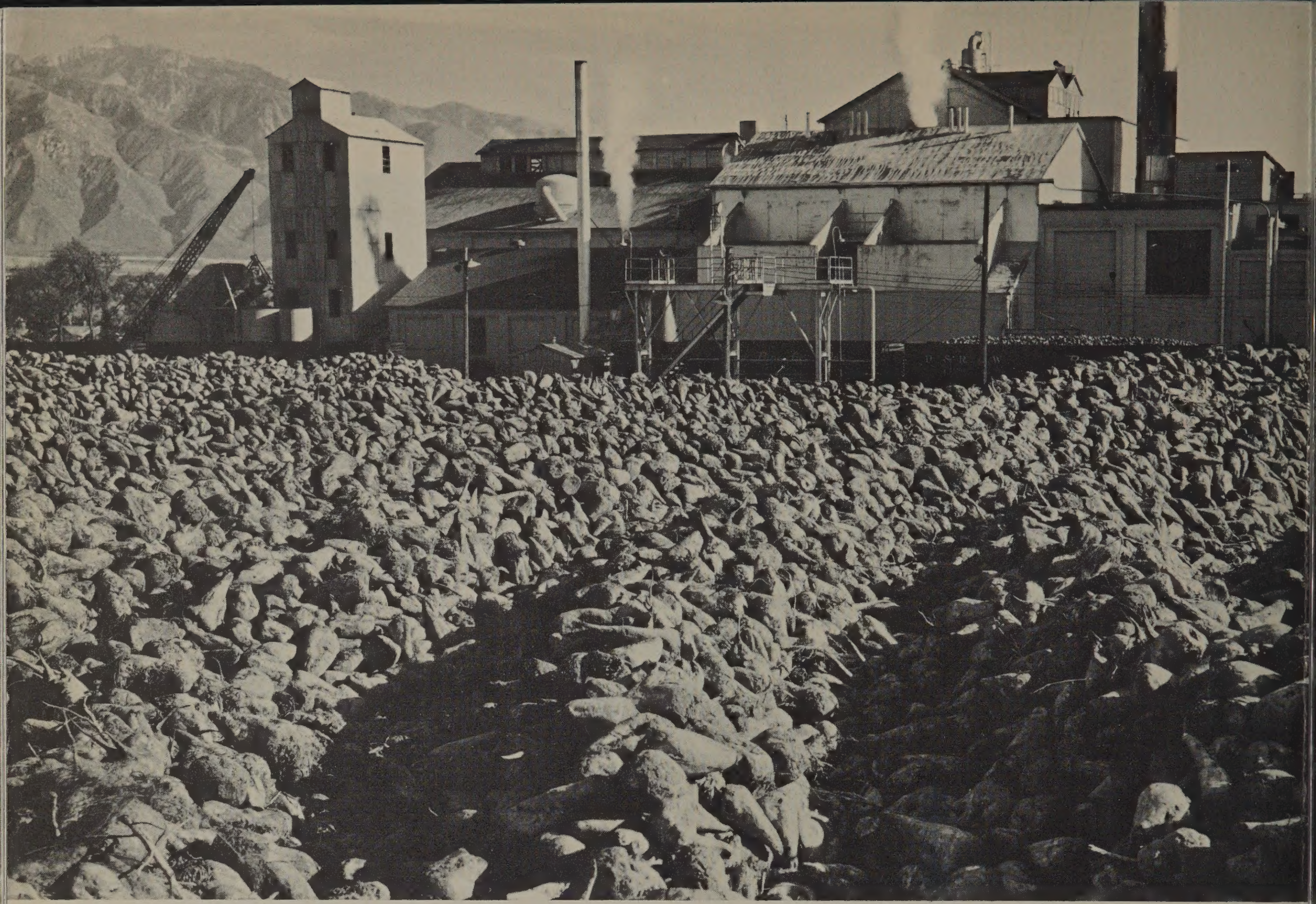
Agriculture is an important industry in Utah, and yearly farm and livestock receipts often exceed $160 million.

Land and Forests

Ever since the Mormon pioneers first plowed the soil, land has meant something special to the people of Utah, in both an economic and personal way. Land provides timber, watershed protection, grazing areas, farmland and also great scenic beauty and places for recreation. About two-thirds of Utah's approximately 52.5 million acres is administered by the Federal Government as public land, national forests and parks, and military reservations. More than two-thirds of the Federally administered land in Utah is primarily used for grazing livestock.

With about a quarter of Utah's land area used for farming and pasture land, agriculture is one of the State's basic industries. Until the outbreak of World War II, more people were engaged in farming than in any other enterprise in the State. But the proportion of farm workers has been significantly decreasing in recent years and now comprises only about 6 percent of the labor force. Nearly two-thirds of Utah's farmers now supplement their agricultural income with revenue from other sources.

Utah farmers raise a wide range of products including wheat, barley, alfalfa hay and seed, oats,



Sugarbeets are one of Utah's most important cash crops. These beets are about to be processed in this sugar plant.

corn, rye, sugar beets, potatoes, peas, corn, tomatoes, carrots, and lettuce. Orchards in the State yield apples, peaches, pears, apricots, and cherries. The most important cash crops are wheat and sugar beets. In a recent year, the value of the State's wheat crop alone was more than $7 million, while sugar beets brought only slightly less. Dairy and poultry products are increasing in importance. Recent annual receipts for dairy products were over $30 million; for turkeys over $14 million, and eggs $8 million. Total agricultural receipts for the same year, including livestock and livestock products, exceeded $160 million.

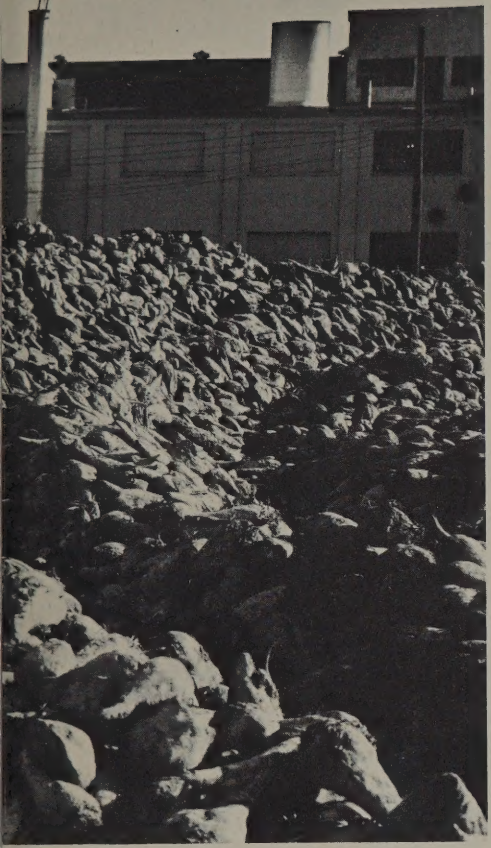
Rangeland Suited for Livestock Grazing

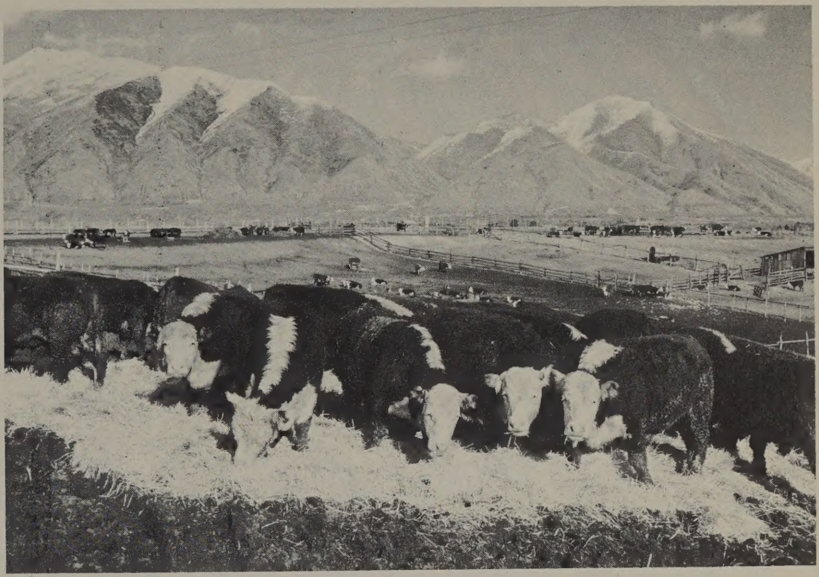
About 70 percent of Utah's approximately 39 million acres of rangeland is set aside as public grazing areas, but such factors as inaccessibility and lack of water make some of it unusable. Much of the rangeland in the desert, for example, can be used only when light winter snows furnish the water needed for stock. Almost 3,000 permit-holding stockraisers graze more than 160,000 cattle and horses and over a million sheep and goats on public land throughout the State. This is more than one-fifth of the State's cattle and horses and four-fifths of its sheep and goats.

Utah's livestock exceeds all other agricultural commodities in terms of the total cash receipts. In a recent year cattle sales amounted to more than $44 million, and cattle production provided employment equivalent to 6,500 full-time jobs. Sales of sheep and lambs totaled over $9 million.

Forested Areas

About 16.2 million acres, or roughly one-third of Utah's total land area, is forested. Most of this woodland is found in the mountainous region running north and south through the center of the State, and





These large-sized Herefords show the effects of commercial feeding. Annual figures indicate that cattle sales bring in over $44 million.

About one-third of Utah's total land area is covered with forests.

much of it falls within the nine national forests administered by the Forest Service, U.S. Department of Agriculture. About 8.8 million acres of public land, administered by the Department of the Interior's Bureau of Land Management, is also woodland. Pinon-pine and juniper predominate in Utah's forests.

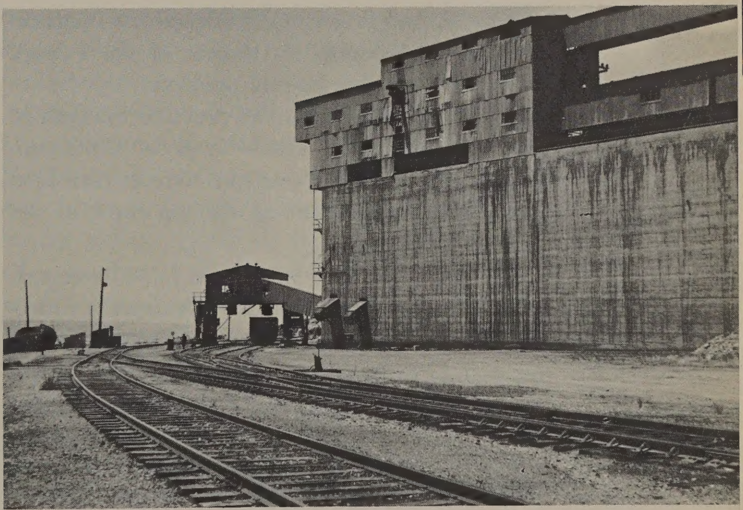
Most of the commercial forest land, comprising about 3.8 million acres, lies in the national forests. The commercial timber is largely softwood, which is used in construction. Lodgepole pine and Engelmann Spruce are the most common softwoods; other varieties include ponderosa pine, Douglas fir, and white fir. Utah State University and the Bureau of Land Management are seeking ways to use the pinon-juniper to economic advantage. At present the species is used for fence posts, fireplace wood, and Christmas trees. Hardwoods, used in making furniture, comprise slightly more than 5 percent of Utah's sawtimber.

Mineral Resources

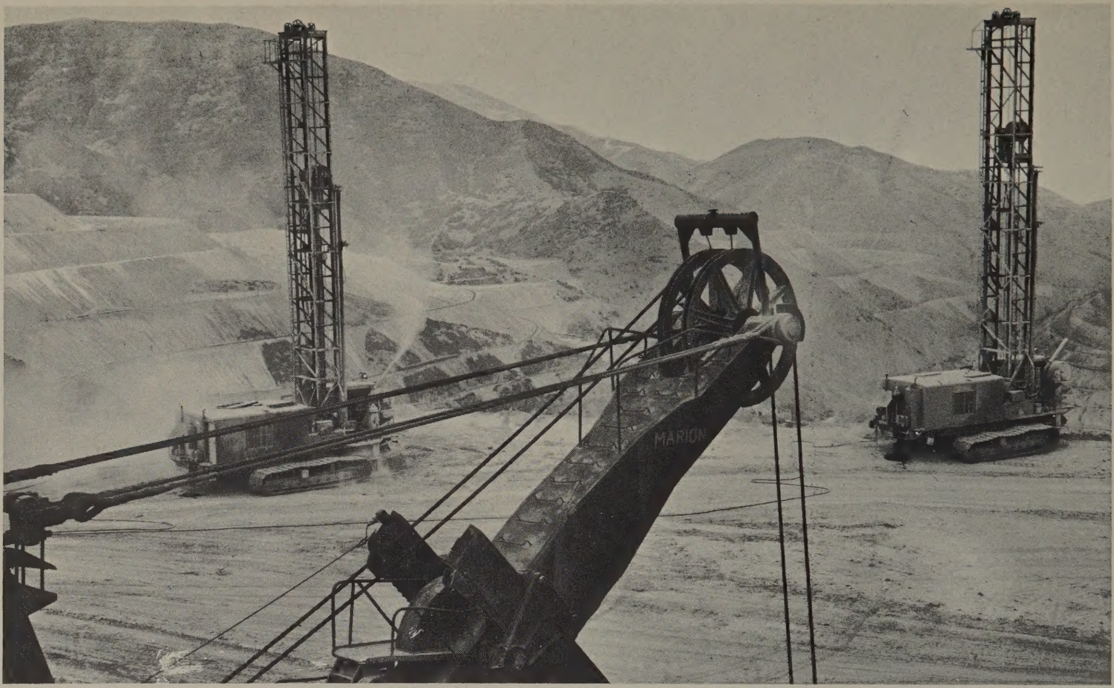
Utah's varied mineral wealth has been an important feature in its economy since the State's earliest settlement. With only brief exceptions, the base of mineral production in Utah has gradually broadened and output has increased throughout the State's history; today it is at an all-time high.

Utah leads the West in coal output and is second in the Nation in copper production. The State is an important supplier of lead, zinc, gold, silver, iron ore, and uranium. Its petroleum and natural gas industry is growing, and it is becoming an increasingly valuable source of such nonmetals as potash, phosphate rock, lime, gypsum, stone, clays, sand and gravel, and cement. Salt should continue to be available from the Great Salt Lake for centuries to come.

Brigham Young and his followers discouraged mining for profit. "We cannot eat gold and silver," the Mormon said, and urged his people to plant and



The huge open pit of the Utah Copper Mine in Bingham Canyon, shown on the left, is the largest in North America. Utah ranks second in national copper production and is a leading producer of western coals.



harvest the land rather dig for its precious metals. Nevertheless, minerals as well as agriculture brought settlers to the new western State and helped spur her industrial growth and progress.

Smelting lead and zinc was one of Utah's first industries, and these two metals, along with copper and silver, have been flowing steadily from her mines and mills since 1879. Utah's motto is "Industry," but it might well be "Mineral Industry" for mining and processing of mineral raw materials accounts for roughly 40 percent of the average annual value of her leading products.

Each of Utah's 29 counties produces minerals of one kind or another. The value of the State's mineral output in a single year runs to more than $400 million, ranking it among the top third of the States in this respect.

And Utah has mineral riches as yet undeveloped. It has been estimated that oil shale deposits within her borders hold more than 120 billion barrels of oil waiting to be recovered when science provides the key that can unlock this store of liquid wealth.

Importance of Metals

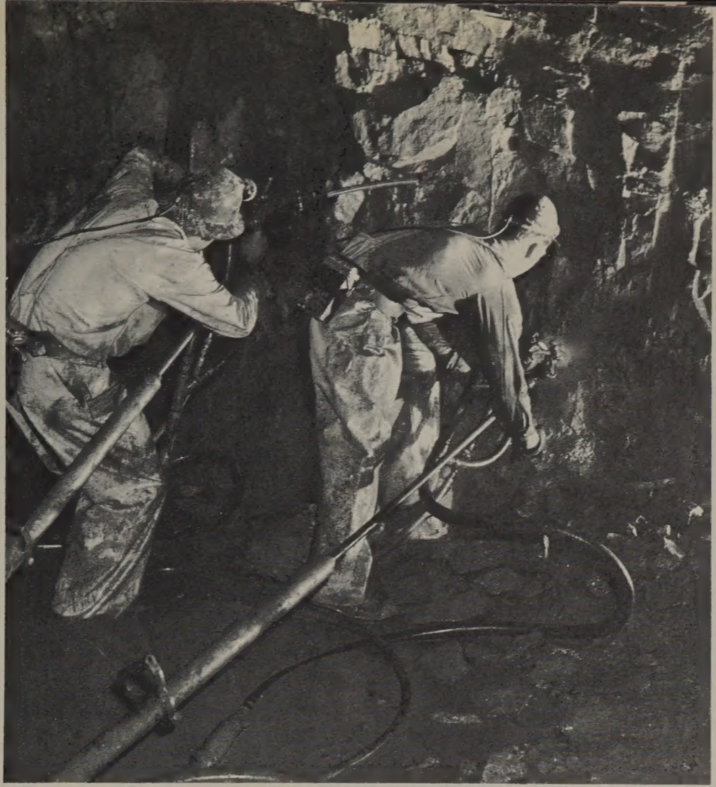
Copper is the State's most important mineral product, its value well over one-fourth (approximately $130 million annually) that of all other minerals. Salt Lake County, in the north-central part of the State, is Utah's leading copper producing area and is also a source of gold, obtained as a by-product of copper mining. The same county also leads the rest of the State in output of lead and zinc. It is Utah's only source of molybdenum, a metal that seems destined for important new uses in the Space Age. Molybdenum is extracted along with copper from North America's largest open-pit mine at Bingham.

Uranium and iron ore, each valued about $20 million yearly, are the metals nearest in economic importance to copper, although they are still far outdistanced in value by the red metal. Uranium brings wealth to eight counties and is the principal mineral product of Piute and Garfield Counties in the south-central part of the State. Iron ore, appropriately enough, comes mostly from Iron County, which is located in southwestern Utah.

Nonmetals

In terms of annual production value, sand and gravel are Utah's most important nonmetallic minerals other than petroleum, representing about 40 percent of the total value of all nonmetal output in the State. Recent annual production of sand and gravel throughout the State was valued at more than $20 million. The principal sources of supply, (left) Drills and an electric shovel are used in the open-pit copper mines.

(right) Holes made in the mine walls are filled with dynamite. After the explosion, the ore and waste rock are loaded by machinery into trucks that are brought straight into the mine.



each producing over a million tons annually, are Kane, Davis, Sevier, Salt Lake, and Daggett Counties.

Potash is important to the economy of Grand County, where a large mine and processing plant are located near Moab. Tooele County also supplies the mineral. Phosphate rock, produced in Rich and Uintah Counties, is sold mostly within the State for use in agriculture and industry.

Most of the State's lime supply, valued for chemical, refractory, and construction uses, is obtained from deposits in five counties in the northwestern section of Utah. Gypsum, extracted from open-pit mines in Sevier County, goes into wallboard that is sold nationally. Utah's clays come from several counties, mostly in the central and north-central parts of the State, and are much in demand for making building brick, fire brick, and other products.

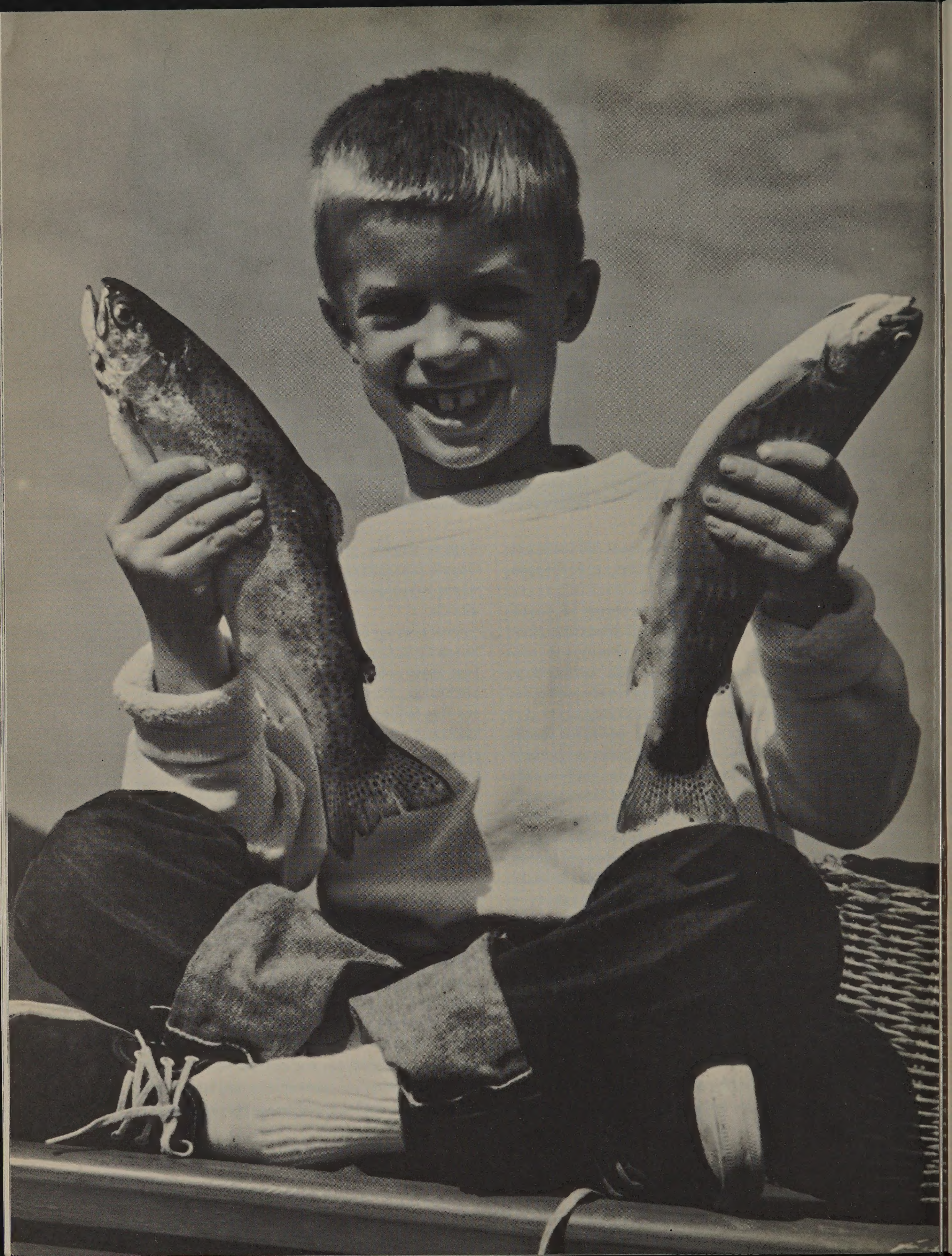
Mineral Fuels

In addition to thriving petroleum and natural gas industries, the Beehive State boasts the Nation's only commercial deposits of gilsonite—a solid hydrocarbon that is processed to make coke and gasoline. Gilsonite mined in Uintah County is mixed with water to make a slurry which is then moved through a 72-mile pipeline to a refinery at Fruita, Colo. Carbon dioxide, collected from wells in Carbon County, also is pipelined to a plant near Wellington, where it is converted to dry ice, and to liquid carbon dioxide.

Utah's bituminous coal industry is concentrated primarily in Carbon and Emery Counties, although Iron, Sevier, and Summit Counties report significant production. Production totals ranging between four and five million tons annually have made Utah the leading Western coal producer for many years. Her coking coals are in great demand among western steel producers.

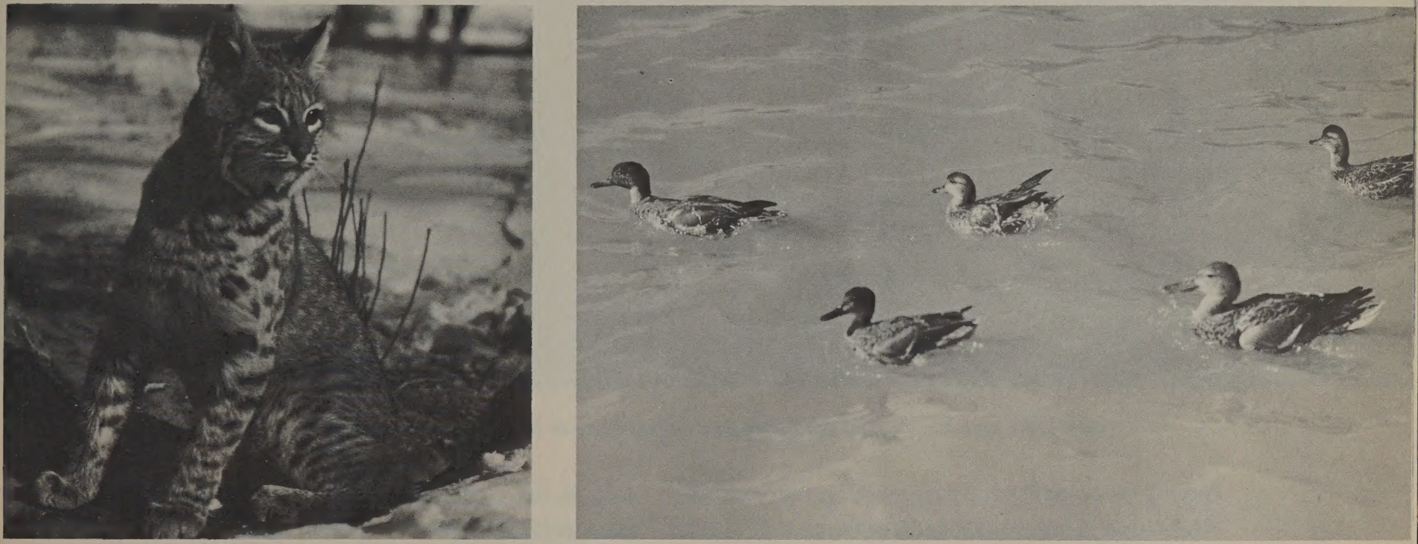
Crude petroleum output ranges in value between $80 million and $90 million annually. Most of the Beehive State's petroleum comes from the Greater Anerth area of San Juan County, in Utah's southeastern corner. Crude oil is also produced in six other counties. Large, nationally known firms and small "wildcat" companies operate successfully within the State, and an aggressive search for new oil reserves continues.

Natural gas and the valuable liquids such as butane and propane derived from it are a growing source of wealth in the State. San Juan and Uintah Counties account for roughly 80 percent of Utah's natural gas production, but the industry is active in at least six other counties and important new sources of this fuel are still being discovered.



Fish and Wildlife

Utah's land variety affords a diversity of fish and game habitats. (Left) Proudly displayed are two rainbow taken from Deer Creek Reservoir. (Below) A bobcat kitten and the shoveler duck and green-winged teals are given homes.



From the forested highlands to the valleys and the marshlands, Utah's plentiful wildlife and waterfowl find almost ideal habitat. The State's 8,000 miles of streams and more than 2,000 lakes support an impressive variety of fish.

With an amazing abundance of fish and wildlife, Utah justly boasts "something for every season." Hundreds of thousands of outdoorsmen, many from out-of-State, find sport in Utah's large public hunting and fishing areas. These hunters and fishermen contribute over $60 million each year to the State's economy. Hunters bag more than 350,000 ducks and geese and over 120,000 mule deer annually.

Elk and moose are found in several areas while mule deer abound near everywhere in the State. Antelope range in widely scattered regions, mainly in the west, south-central and northeastern sections. Small herds of bighorn sheep roam the Uinta and LaSalle Mountains, often wandering into gorges of the Colorado and Green River Systems. Utah also has several herd of buffalo, including a small, privately owned herd on Antelope Island in Great Salt Lake and a wild herd of about 80 head in the Burr Desert of south-central Utah.

Seven species of rabbit run throughout the State, while numerous bobcat, cougar (mountain lions), and some black bear prowl the back country. Organized mountain lion hunts have become increasingly popular in many parts of Utah.

Water and Game Birds

The large areas of both wild and man-made marshland in northern Utah provide habitat for the great numbers of waterfowl migrating along the Pacific Flyway. Ducks and geese in large numbers use these wetlands for resting, feeding, and breeding.

Deer Lake near Provo, Utah, provides sport fishery reserves for thousands of anglers each year.

Among the waterflowl species found in the State are the Canada goose, baldpate, gadwall, green-winged teal, mallard, redhead, pintail, and, less widely distributed, the canvasback duck and whistling swan. Approximately 200 different species of birds have been recorded at various refuges. Several of the islands in Great Salt Lake also serve as headquarters for thousands of sea gulls, pelicans, cormorants, egrets, ibises, and avocets.

Three national wildlife refuges, supervised by the Department of the Interior's Bureau of Sport Fisheries and Wildlife, have been established on the Pacific Flyway for waterfowl and other birds. Bear River Migratory Bird Refuge, encompassing almost 65,000 acres, is an important shelter for birds nesting in Canada and Alaska and wintering southward in Mexico. Ouray National Wildlife Refuge is being developed as a prime waterfowl area which will eventually produce 14,000 ducks and geese annually and provide a resting place for as many as 78,000 migrating birds. Fish Springs National Wildlife Refuge, comprising nearly 18,000 acres in the desert area of the Great Basin, is a nesting and feeding ground for migratory waterfowl and other birds.

Some of the upland game birds hunted in Utah are Chinese pheasants, California and Gambels quail, mourning doves, Merriam's turkey, ruffed, sage, blue, and dusky grouse, and Hungarian and Chukar partridges. Chukar partridges, introduced into the State several years ago, are numerous and have become increasingly popular game birds.

Many Species of Fish

Forty-nine different species of fresh-water fish, of which 26 are native to the State, are found in Utah's waters. Nineteen of these are game fish which are being managed to provide good angling for the public. The backbone of Utah's fishery resources is the rainbow trout, found in natural lakes, streams, and man-made impoundments in the Uinta and Wasatch Mountain ranges. The cutthroat or brook trout is also fairly common. Other game fish

This adventurous hunter is about to capture a mountain lion alive in southwestern Utah.

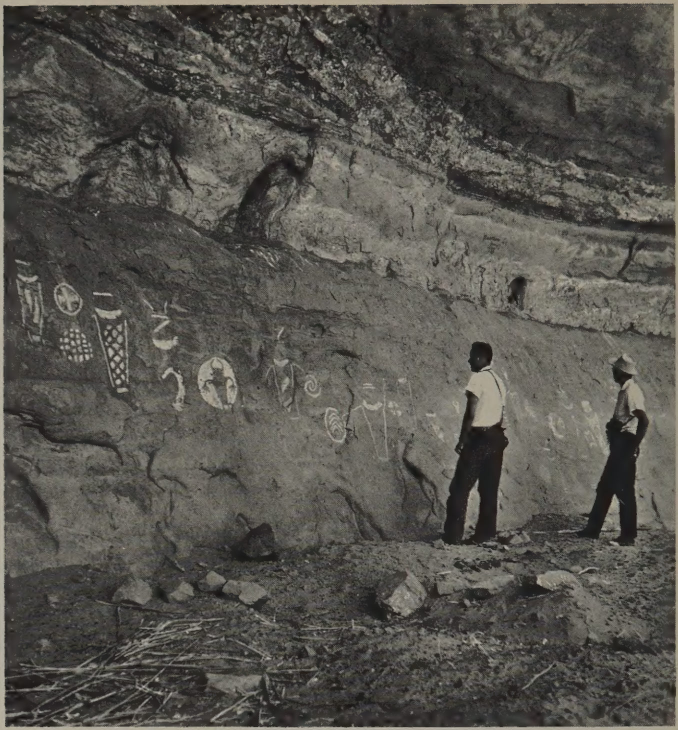
include five other types of trout, five species of sunfish and bass, three of whitefish, two of catfish, and one of grayling and salmon.

The Utah Fish and Game Department annually produces in its 11 State hatcheries approximately 14 million fish, which are used to restock lakes and streams. In cooperation with the fish and game department, the Springville National Fish Hatchery, administered by the Department of the Interior's Bureau of Sport Fisheries and Wildlife, produces and distributes an average of nearly 1.5 million fish annually, including rainbow and brook trout, largemouth black bass, and bluegill sunfish. Lake Powell, formed by Glen Canyon Dam on the Colorado River, has been stocked with rainbow trout and largemouth bass and is already providing excellent fishing for these species. In Flaming Gorge Reservoir on the Green River, rainbow trout stocked from Federal and State hatcheries are giving sport to anglers.

Excellent fishing is found in the primitive areas, particularly in the hundreds of lakes and streams of the high Uintas of eastern Utah, where pack trip or hiking is required to reach the more secluded fishing waters. Here is some of the best cutthroat trout fishing on the continent. A few of these lakes also produce golden trout.

At Daggett Lake in the Uintas, sportsmen may test the gameness of the frayling, and Logan, Blacksmith Fork and Weber River as well as most streams in the State have mountain white fish. Bear and Fish Lakes are noted for their lake (Mackinaw) trout, some weighing up to 40 pounds. Dip-netting for Bonneville cisco is gaining in popularity at Bear Lake, the only place in the world where this fish is found. The kokanee salmon, walleye, and white bass, though of limited distribution, add variety to the fisherman's creel.

Common in several streams and abundant in the 22-mile long Utah Lake, the channel catfish is one of the most important warm-water fish in Utah. Other warm-water species found in lower evelation impoundments and sluggish streams are largemouth bass, black bullhead and bluegill.



Indians and Their Resources

About 4,500 Indians, mostly farmers and stockraisers, live in Utah today. They trace their ancestry to three major tribes: the Utes, who lived in the eastern and central portions of Utah and gave the State its name; the Paiutes, occupants of the southwest region; and the Shoshoni including the Goshute, primarily plains dwellers who lived west and north of Utah Lake. Although Utah's present day Indians retain little of their original cultures, they occasionally perform the old native dances and gain some income from their artistic handicrafts.

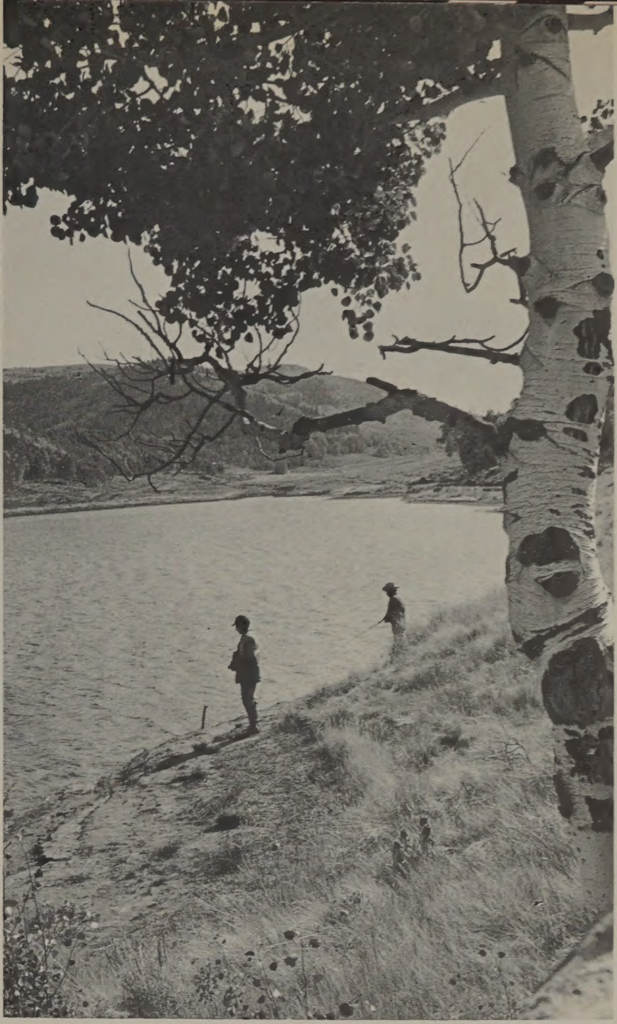
Utah's Indians were first settled on reservations in 1861, but it was not until sixty years later that the last Indian reservation was established. The largest Indian Reservation in Utah today is the Navajo Reservation, which covers more than a million acres in Utah and extends into Arizona and New Mexico. The four other reservations are the Uintah and Ouray Reservation, encompassing over 800,000 acres, the Goshute Reservation, with about 38,000 acres in Utah and a larger area in Nevada, the Skull Valley Reservation, covering over 17,000 acres, and the Ute Mountain Reservation, which includes about 2,000 acres in Utah and a greater area in Colorado and New Mexico.

Over 2 million acres of land in Utah are held in trust for the Indians by the Federal Government and nearly all of this land is tribally owned. Individual Indians own slightly over 70,000 acres. In addition, several hundred acres of Federally owned lands are used for the benefit of the Indians.

Indians use their land to graze livestock, grow crops, produce timber, develop oil, gas and other minerals, and provide recreational opportunity. The Department of the Interior's Bureau of Indian Affairs assists the Indians in developing the economic potential of their land and water resources.

Utah's Indians have recently begun to recognize the profit potential of tourist developments on their reservations. The Uintah and Ouray Reservation, for example, now offers tourists a wide variety of outdoor activities, including big game hunting and (below) The Cattle Enterprise, now in its second year of operation, is an important project on the Uintah and Ouray Reservation.

(left) These extensive petroglyphs in Davis Gulch were painted on red sandstone cliffs by the Indians hundreds of years ago.



Two sportsmen enjoy a little trout fishing in Weaver Reservoir which is a fringe benefit to many Indian deer hunting parties.

mountain climbing and programs of native dancing that give visitors a better understanding of Indian culture.

Oil and gas development account for almost all the mineral activity on Indian lands in Utah. Approximately 800 oil and gas leases cover more than 720,000 acres on the Uintah and Ouray, and the Navajo Reservations. Oil and gas discoveries were made in the Aneth extension of the Navajo Reservation in southeastern Utah following World War II. Subsequent exploration and leasing have made the area one of the principal producing fields in the Nation.

Livestock grazing figures importantly on the Navajo and the Uintah and Ouray Reservations. Over two-thirds of the Uintah and Ouray Reservation land, varying from semi-desert areas suitable for winter grazing to forested mountain areas usable for short periods in the summer, is used to graze cattle. Several thousand big-game also graze on this land. The majority of the rangeland is used by tribal members while about 20 percent is available for leasing to non-Indians. About 44 percent of the Navajo Reservation is rangeland, providing open grazing for sheep.

With the emphasis on livestock, chief agricultural products from reservation land are hay and forage for pasture. Farmers also raise some barley and corn and cultivate small garden tracts. Irrigation projects or systems serve areas as large as 77,000 acres. The largest irrigation project on Indian lands in Utah is the Uintah project in which a rehabilitation program to improve operating standards and provide better service to water users is underway.

Timber production is centered on the Uintah and Ouray Reservation, which has about 15,000 acres of commercial timberlands and is the only reservation in Utah with significant timber resources. However, transportation to other than local markets is difficult, making expanded production economically hazardous.

Outdoor Recreation

Information tables listing major Federal, State, and local recreation areas in Utah and a location map appear at the end of this chapter. The acreage, type of visitor use, and outdoor activities available at the various parks, forests, and recreation sites are found on the tables.

Utah—land of sun-baked deserts, multicolored sandstone cliffs, and tortuous canyons—contains some of the Nation's most spectacular natural beauty. But striking scenery is only one of the State's many attractions. Natural and man-made recreational areas in Utah offer camping, hiking, mountain climbing, horseback riding, hunting, fishing, swimming, and water sports. These recreation opportunities attract 4½ million tourists to Utah annually, contributing $135 million to the State's economy. Tourism, already one of the State's important industries, is steadily increasing.

Hiking and camping are popular with Utah's residents, particularly with its city-dwellers, who often find respite from summer heat in trips to higher altitudes. Vacationists from more densely populated areas of the country find a refreshing tranquility in Utah's mountain and desert areas.

The Wasatch Mountains of Utah (left) provide excellent winter playgrounds for ski enthusiasts. (Right) This trail is being constructed by the U.S. Forest Service. It will run parallel to the Green River through scenic canyon country.

With its many acres of near-wilderness, Utah affords excellent opportunities to sportsmen. Game abounds in much of the State and Utah's well-stocked fishing streams and lakes are appealing to the angler. Some hunting and fishing is permitted at the Bear River National Wildlife Refuge. The Uintah and Ouray Reservation, in the Uintah Basin of northeast Utah, offers boating and a wide variety of other recreational activities. Complete auto and boat facilities, accommodations, restaurants, and camping areas are available at the nearby towns of Vernal, Roosevelt, and Duchesne.

National Park System

Utah's three national parks, eight national monuments, and one national recreation area comprise more than 1.5 million acres of land. The number of visitors to these areas is approaching the 2 million mark annually.

Bryce Canyon National Park, in southern Utah, has some of the most colorful and unusual erosion formations in the world. High above Bryce Canyon lies the jagged edge of Paunsaugunt Plateau, which is renowned for its pink cliffs and fantastic rock sculptures. Carved along its 20 mile rim are huge limestone amphitheatres with twisted spires and pinnacles, which resemble miniature cities, cathedrals, and windowed walls. The rim is streaked with colors ranging from pink, red, orange, yellow, and lavender to grey, brown, and white. In addition to this magnificent scenery, the Park has cabins, campgrounds, shops, and hiking trails which make it one of Utah's prime tourist attractions.

Canyonlands National Park, southwest of Moab near the confluence of the Green and Colorado Rivers, is the Nation's thirty-second national park. This new park presents a magnificent sweep of scenic wonders—red-rock canyons, arches, needles, spires, standing rocks, roaring rapids. The geologic scenery in the park is majestic, varied, colorful, and, above all, evident.

Throughout the Park, adventurous visitors can make trips by foot or by jeep into the intricate canyons and around imposing rock formations. Parts of the park will remain wild back country, suitable for pack trip explorations on horseback. Some of the region remains to be explored for the first time and offers the thrill of a true wilderness experience.

Since Canyonlands National Park is a recent addition to the national park system, the work of constructing improvements and visitor facilities is only beginning. Camping and picnicking sites are being developed, trails marked for hiking, and roads for auto and jeep trips.

Zion National Park, in southwestern Utah near Springdale, was the State's first area to be included in the National Park System. Centered around the Zion Canyon of the North Fork and other tributaries of the Virgin River, this park is noted for its colorful canyons, sheer rock walls, and impressive rock formations.

The awesome scenery here seems to have evoked a religious wonder in its first viewers. The early Mormons named the region "Zion"—interpreted as "the heavenly city of God"—and formations along Zion Canyon are variously called Towers of the Virgin, East Temple, Great White Throne, and Cathedral Mountain. At one point, named The Narrows, the canyon dwindles to a 1,500 foot chasm which in places is only a few feet wide with overhanging walls.

The variety of colorful vegetation makes a striking contrast to the stone masses that form the canyon walls. Where soil and moisture are adequate, trees such as cottonwood, ash, willow, maple, pine, fir, and quaking aspen are common. Cactuses, yucca, mesquite, and the beautiful white evening-primrose, a "night-blooming" plant whose petals open only in the evening, are also found in the Park.

Arches National Monument, in the heart of the famed red-rock country of southeastern Utah, contains more natural stone arches, windows, towers, spires, pinnacles, and vertical slabs than any other section of the Nation. Visitor attractions include Devils Garden, an area so rugged that parts of it have not yet been fully explored, and Landscape Arch, which is a standstone arch 291 feet long.

Capitol Reef National Monument, in south-central Utah, is named for its domed sandstone pinnacles which resemble the architecture of the Capitol and its cliffs which look like sea reefs. Prehistoric Indians, known as Frèmont Basketmakers, once lived here and their colored carvings may be found on the smooth cliff walls.

Cedar Breaks National Monument, near Cedar City in southwestern Utah, is on the Markagunt Plateau which reaches an elevation of over 10,000 feet in some places. The Monument is noted for a gigantic, multi-colored natural amphitheater, 2,000 feet deep, with steep slopes and high Pink Cliffs. The five-mile Rim Drive offers spectacular vistas.

Dinosaur National Monument, in northeastern Utah, has the world's most remarkable dinosaur fossil deposit. With its deep canyons and tilted and colorful rock layers, the region is a scenic wilderness. Here scientists have found fossilized skeletons of dinosaurs, crocodiles, and turtles as well as the petrified remains of various tropical plants. Of special interest to tourists is the Dinosaur Quarry Visitor Center, where visitors can watch workmen use jackhammers, chisels, and picks to expose the fossil bones.

Hovenweep National Monument, partly in southeastern Utah and partly in Colorado, contains six groups of prehistoric towers, pueblos, and cliff dwellings built by the Pueblo Indians, early inhabitants of the area. The small (500 acres) monument, lying in the lonely canyon country northeast of the San Juan River, appropriately takes its name from an Indian word for "deserted valley." Even today it remains comparatively untouched by contemporary civilization, having neither paved roads, tourist accommodations, nor stores.

Natural Bridges National Monument, in southeastern Utah's San Juan County, is an area of brilliantly colored cliffs, tortuous box canyons, pinnacles, and arches. The three huge natural bridges within the monument—one spanning a 600-foot-deep canyon—are among the largest known.

Canyon Lands National Park, created by the 88th Congress, is one of the Nation's newest parks—a scenic wonderland.

Rainbow Bridge National Monument, in the semidesert country of southeastern Utah, is named for colorful and symmetrical Rainbow Bridge, which is the largest known natural bridge. The 278-foot span arches to a height of 309 feet, making it large enough to straddle the Nation's Capitol building in Washington, D.C.

Timpanogos Cave National Monument is only seven miles from Salt Lake City. Here snow-capped Mount Timpanogos towers 12,000 feet above a jumble of lesser peaks. On its slopes are a series of beautiful caverns. Effectively illuminated by electric lights, many of the limestone chambers of these caverns are covered by a filigree of pink and white translucent crystals that glow and sparkle like exotic jewels. The outstanding feature of the Cave is the Great Heart of Timpanogos, a colorful and glistening heartshaped formation extending from one of its walls.

Glen Canyon National Recreation Area, encompasses over a million acres of land in Utah and extends into Arizona. A few miles below the State boundary at Page, Arizona, the Bureau of Reclamation's Glen Canyon Dam on the Colorado River forms Lake Powell. A water-rich playground in desert country, this recreation area is expected to become one of the most popular in the Nation.

Golden Spike National Historic Site at Promontory, Utah, commemorates the historic Golden Spike ceremony held May 10, 1869, which marked the completion of the first transcontinental railroad.

National Forests

Utah's nearly 8 million acres of national forest land, administered by the Department of Agriculture's Forest Service, offer a great variety of recreational opportunities. In a recent year, over 8 million people visited these forests, more than half of them using the camping and picnicking facilities there. In the same year, over half a million fun seekers came to ski at the ten winter sports areas and hunters bagged nearly 100,000 big game animals in the national forests.

Sketches of Utah's national forests follow:

Ashley, with headquarters at Vernal, comprises a portion of the rugged High Uintas Primitive Area. Some of its more noted scenic attractions are Kings Peak (the highest point in the State), the 1,500-foot deep Red Gorge of the Green River, geological formations a billion years old, scenic gorges and striking erosion formations. Recreation opportunities include lake and stream fishing, and hunting for deer, elk, and antelope. The forest also offers skiing at Grizzly Ridge Winter Sports Area.

Cache, with headquarters at Logan, covers more than 650,000 acres, of which nearly half lie in Idaho. Among the attractions here are the Bear River and Wasatch Mountain Ranges, Minnetonka Cave, Logan and Ogden Canyons, and Monte Cristo Mountain. Bear Lake and Pine View Reservoirs are nearby. The forest has fishing, hunting, scenic drives, riding and hiking trails, and contains the Beaver Mountain and Snow Basin Winter Sports Areas.

Dixie, with headquarters at Cedar City, offers such scenic attractions as Red Canyon, Panguitch and Navajo Lakes, Pine Valley Mountains, Boulder Top Plateau, and many lakes which are innaccessible by road. Table Cliff Point affords a view into four States—Colorado, Arizona, Nevada, and Utah. Deer, elk, and cougar and numerous fish in the lakes and streams engage the sportsman, while skiers flock to Cedar Canyon Winter Sports Area.

Fishlake, its central offices at Richfield, includes the Beaver Mountains Thousand Lake Mountain Scenic Area, Fish Lake, Petrified Wood Scenic Area, and Gooseberry Winter Sports Area.

Manti-LaSal, headquartered at Price, encompasses over 1.2 million acres, some of which extend into Colorado. Among the attractions are the Wasatch Plateau, Skyline Road through high alpine meadows and glades, Indian hieroglyphics and cliff dwellings, riding and hiking trails, scenic drives, and the Blue Mountain Winter Sports Area.

Wasatch, with headquarters at Salt Lake City and sections reaching into Wyoming, also includes part of the High Uintas Primitive Area. Here, nearby Salt Lake City dwellers can boat, swim, hike, ride, ski, skate, and go mountain climbing. Other attractions include Mirror, Bridger, and Gradaddy Lakes. There are also four winter sports areas—Alta, Brighton, Solitude, and Little Mountain.

Uinta, with headquarters at Provo, includes such scenic attractions as Timpanogos Cave National Monument, Alpine Scenic Highway around Mount Timpanogos, and Nebo Scenic Loop Road. Various canyons with spectacular waterfalls cutting through Wasatch limestone are found near Provo. Mountain streams offer excellent fishing, and deer and elk abound in the forest lands. A 6-mile hiking trail leads to the top of 12,000-foot Mount Timpanogos.

The *Sawtooth* and *Caribou* have some portions in Utah, but both fall primarily in Idaho. Sawtooth has one small developed campground in Utah, but Caribou has no recreation facilities in the State.

Sites on Public Land

Many of Utah's outstanding scenic and recreation sites are located on public domain lands, which are administered by the Department of the Interior's Bureau of Land Management. Although these sites are largely undeveloped, many afford excellent hunting, fishing, camping, and other recreational opportunities enjoyed by an increasing number of visitors yearly.

Grand Gulch, a public land area near State Highway 95 in southeastern Utah, contains ruins of a civilzation which mysteriously left the region about the time Columbus discovered America. Visitors can see the remains of hundreds of dwellings and other structures built on windswept plateaus under the protective overhangs of cliff walls. Highway 95 also passes the Henry Mountains, where the country's only completely unfenced buffalo herd is found.

Ten camping and picnic sites have been developed by the Bureau of Land Management with Accelerated Public Works funds. One of these is the Red Cliffs campground, 15 miles northeast of St. George. Nestled amid brilliantly colored cliffs, the site has 10 family units including picnic tables and raised grills. A small stream flows through the

These archers are crossing a trail bridge in Logan Canyon, one of the outstanding mountain canyons which Utah possesses.

grounds and a foot trail leads up the canyon to scenic lookouts.

Other developed sites are Calf Creek, 15 miles east of Escalante; Lonesome Beaver, 25 miles south of Hanksville; McMillan Springs, 40 miles southwest of Hanksville; Price Canyon, 7 miles northwest of Price; San Rafael Bridge, 48 miles southeast of Price; Hatch Point, 39 miles northwest of Monticello; and Needles, Anticline, and Canyonlands Overlooks, about 60 miles northwest of Monticello. With the exception of these last two overlooks, all the sites have camping or picnic facilities. Additional information about the sites may be obtained from the Bureau of Land Management State Office which is located in Salt Lake City.

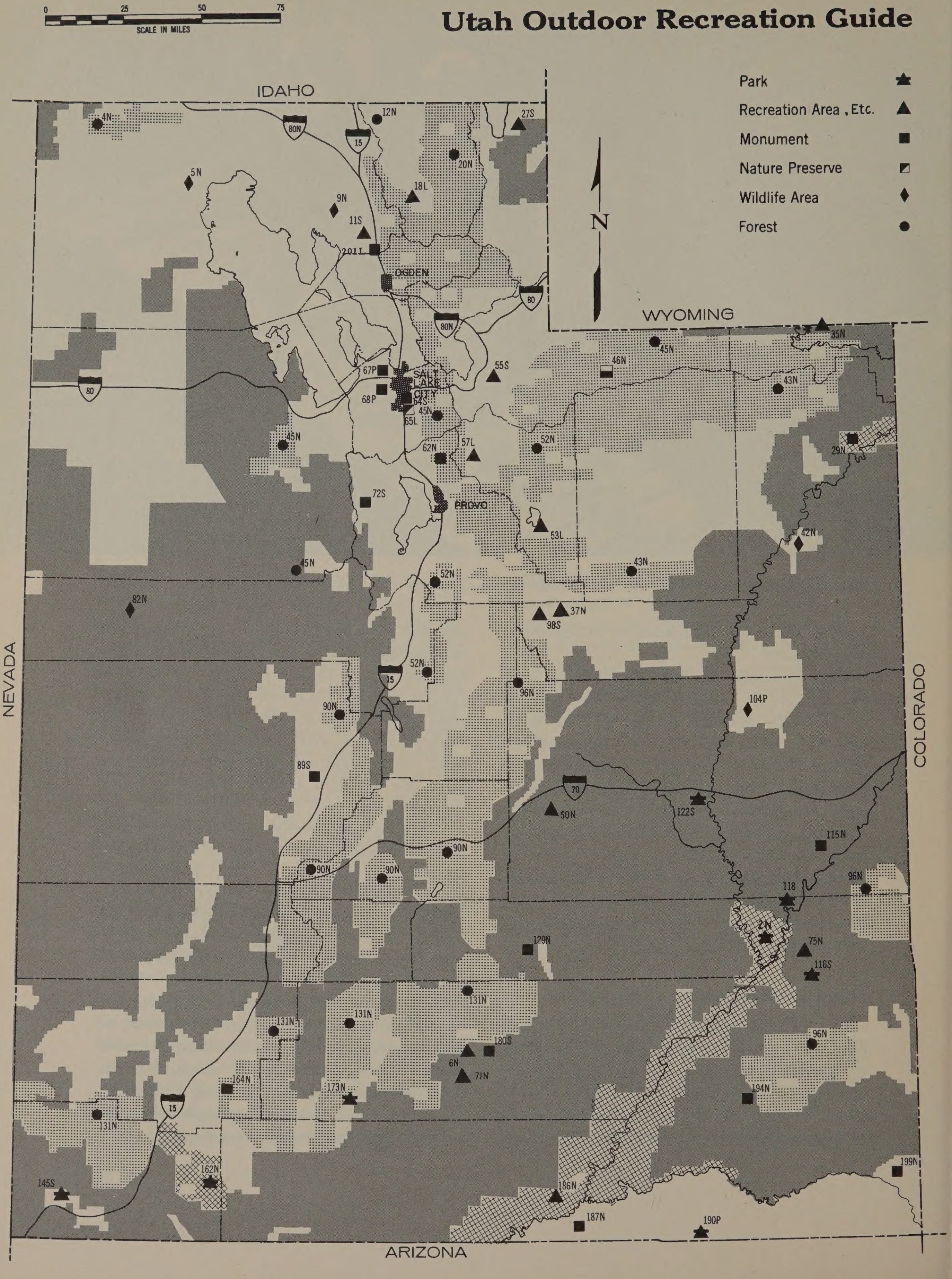
Numerous State Areas

Utah has several recreational areas developed by the State Park and Recreation Commission, including historic parks, State parks, and boating parks. Among the historic sites are the Brigham Young Winter Home in St. George, the Old State House of 1855 at Fillmore, and the Pioneer Monument, inscribed "This is the Place", which commemorates the Mormon arrival in 1847 at Emigration Canyon, Salt Lake City. Three State Parks—Dead Horse Point near Moab, Dixie near St. George, and Wasatch Mountains near Midway—offer spectacular vistas of canyons, cliffs, and snow-capped mountains. Other areas with great scenic and historic value, too numerous to mention here, are found throughout the State.

Privately-owned recreation facilities, such as fine hunting areas and summer camps for boys and girls, are also quite important in Utah. Many persons operate vacation farms or ranches for tourists. Others lease hunting areas and often provide cabin facilities as well. Camping, picnicking, fishing, hiking, horseback riding, and guide services are also privately offered.

Organizations such as petroleum companies, motel and hotel associations, airlines and railroads, local chambers of commerce, outdoor clubs, and travel bureaus can supply information on many of the privately-owned facilities. The Utah Tourist and Publicity Council, 327 State Capitol Building, Salt Lake City, and local inquiry are also helpful.

Utah Outdoor Recreation Guide


0
25
50
75
SCALE IN MILES
Park ★
Recreation Area, Etc. ▲
Monument ■
Nature Preserve ◪
Wildlife Area ◆
Forest ●
N
IDAHO
WYOMING
NEVADA
COLORADO
ARIZONA
OGDEN
SALT LAKE CITY
PROVO
80N
15
80
70
4N
12N
27S
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89S
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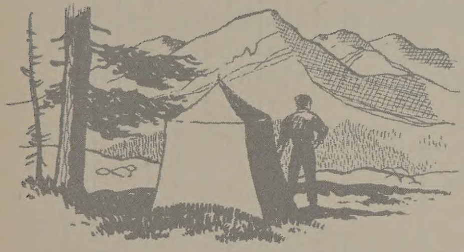
122S
115N
90N
90N
90N
96N
118
2N
75N
129N
116S
131N
131N
131N
96N
180S
6N
71N
164N
173N
194N
131N
162N
145S
186N
199N
187N
190P

NATIONAL PARK	▩
NATIONAL FOREST	▦
NATIONAL WILDLIFE REFUGE	▨
PUBLIC LANDS **ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT**	■

HOW TO USE THIS GUIDE

The symbols on this map represent major areas in Utah offering recreation. Areas described in the listings on the following pages may be located on the map by matching the numbers with the numbers beside the map symbols. Letters in the number refer to Federal (N), State (S), local (L), and quasi-public and private (P). Only major interstate highways and major cities are shown on the map. A more detailed road map can provide exact locations for those areas you may wish to visit.

	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface (1)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
FEDERAL																	
Parks:																	
Canyonlands National Park	2N	257, 640	....	x	x	x	x	x	x	x	x	..	x	..	x	..	x
Zion National Park	162N	143, 254	....	..	x	x	x	x	x	x	..	..	..	..	x	..	x
Bryce Canyon National Park	173N	36, 010	....	..	x	x	x	x	x	x	..	..	x	..	x	..	x
Recreation areas:																	
Glen Canyon National Recreation Area (Utah portion)	186N	1, 336, 844	162, 700	..	x	x	x	x	x	x	x	x	x	..	x	..	x
Flaming Gorge National Recreation Area Project (Utah portion)	35N	16, 000	42, 000	x	x	x	x	x	..	x	x	x	x	..	x	..	..
Monuments:																	
Scientific:																	
Timpanogos Cave National Monument	62N	250	....	x	x	x	x	x	x	x	..	..	..	..	x	..	..
Arches National Monument	115N	34, 250	....	..	x	x	x	x	x	x	..	..	..	..	x	..	x
Capitol Reef National Monument	129N	36, 133	....	..	x	x	x	x	x	x	..	..	..	..	x	..	x
Cedar Breaks National Monument	164N	6, 172	....	..	x	x	x	x	x	x	..	..	..	..	x	..	x
Rainbow Bridge National Monument	187N	160	....	..	x	x	..	..	x	x	..	..	..	..	x	..	x
Natural Bridges National Monument	194N	2, 650	....	..	x	x	x	..	x	x	..	..	..	..	x	..	x
Dinosaur National Monument (Utah portion)	29N	47, 669	....	..	x	x	x	x	..	x	x	..	x	..	x	..	x
Historic:																	
Hovenweep National Monument (Utah portion)	199N	160	....	..	x	x	x	..	x	x	..	..	..	..	x	..	x
Forests:																	
Sawtooth National Forest (Utah portion)	4N	71, 117	....	..	x	..	x	x	x	x	..	..	x	x	x	x	x
Caribou National Forest (Utah portion)	12N	6, 474	....	..	x	..	..	..	x	x	..	..	..	x	x	..	..
Cache National Forest	20N	391, 720	3, 045	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ashley National Forest	43N	1, 282, 829	4, 744	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Wasatch National Forest	45N	822, 197	5, 352	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Uinta National Forest	52N	774, 901	5, 610	x	x	..	x	x	x	x	..	..	x	x	x	x	x
Fishlake National Forest	90N	1, 415, 665	4, 538	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Manti-La Sal National Forest (Utah portion)	96N	1, 237, 128	334	..	x	..	x	x	x	x	..	..	x	x	x	x	x
Dixie National Forest	131N	1, 851, 341	3, 489	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Wilderness: Uinta Primitive Area	46N	244, 000	....	x	x	x	..	..	x	x	..	..	x	x	x	x	x

See footnotes at end of table.

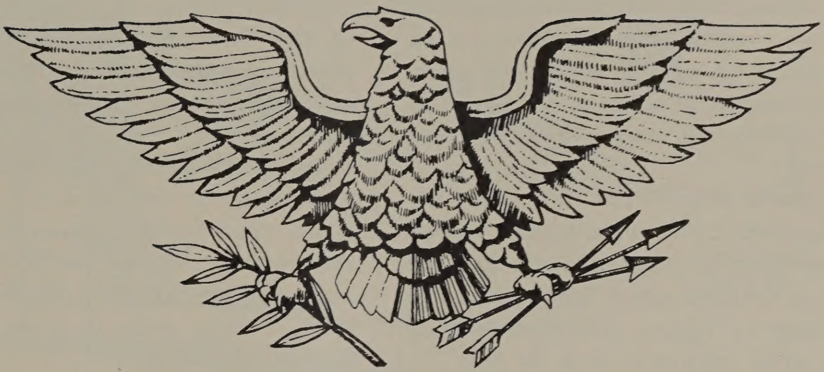
	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface (1)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
Wildlife areas:																	
Locomotive Springs National Wildlife Refuge	5N	1, 031	S		x				x	x	x		x	x	x		x
Bear River Migratory Bird Refuge	9N	64, 899	50, 000	x	x		x	x	x	x	x		x	x	x		
Ouray National Wildlife Refuge	42N	1, 089			x		x	x	x	x				x	x		
Fish Springs National Wildlife Refuge	82N	17, 872			x		x						x		x		
Public lands (2):																	
Calf Creek	71N	40		x		x	x	x	x	x		x		x			
Henry Mountains	6N	200, 000		x	x	x		x	x	x				x	x		x
Price Canyon	37N	80		x		x	x	x	x	x					x		
San Rafael	50N	40		x				x	x	x							
Canyon Rims	75N	30, 000		x	x	x	x	x	x	x				x	x		x
STATE																	
Parks:																	
Newspaper Rock State Park	116S	10					x	x							x		
Dead Horse Point State Park	118S	3, 230			x	x	x	x	x	x					x		x
Green River State Park	122S	53		x	x		x	x	x	x	x		x		x		
Dixie State Park	145S	1, 436		x	x		x	x	x	x					x	x	
Recreation areas:																	
Willard Reservoir	11S	10, 979	10, 700	x	x		x	x			x	x	x				
Bear Lake State Park	27S	22	L	x			x	x	x	x	x	x	x	x	x	x	
Rockport Lake State Park	55S	1, 577	1, 077	x	x		x	x	x	x	x	x	x		x		
Scofield Reservoir and Eccles Canyon	98S	2, 840	2, 800	x	x		x	x	x	x	x	x	x	x	x		
Monuments: Historic:																	
Pioneer Monument State Park	64S	85		x			x	x									
Camp Floyd-Old Stagecoach Inn	72S	40		x			x	x									
Old State House State Park	89S	1					x	x							x		
Anasazi Indian Village State Park	180S	7		x			x	x							x		
MAJOR LOCAL																	
Recreation areas:																	
Hyrum Reservoir	18L	1, 260	500	x	x		x	x	x	x	x	x	x	x	x		
Strawberry Reservoir	53L	50, 688	6, 500	x	x		x	x	x	x	x	x	x	x	x		
Deer Creek Reservoir	57L	4, 552	2, 683	x	x		x	x	x	x	x	x	x	x	x		
Nature preserve: City Creek Canyon	65L	12, 000		x			x	x	x						x		
Monument: Historic: Golden Spike National Historic Site	201L	7															
MAJOR QUASI-PUBLIC AND PRIVATE																	
Park: Monument Valley Tribal Park	190P	90, 000			x	x	x	x	x	x					x	x	x
Monuments: Historic:																	
Lion House-Salt Lake City	67P	1		x			x										
Beehive House-Salt Lake City	68P	1		x			x										
Wildlife area: Steer Ridge	104P	2, 200			x	x			x	x			x	x	x		x

Footnotes:

(1) *Where water surface acreage not shown: "S" indicates water area under 500 acres. "M" indicates water area of 500 to 10,000 acres. "L" indicates water area of over 10,000 acres.*

(2) *Recreation areas on lands administered by the Department of the Interior's Bureau of Land Management.*

Programs of Federal Natural Resource Agencies



The natural resource functions of the Federal agencies represented in this booklet are extensive and detailed and are only briefly described. Additional information can be obtained by contacting the offices noted in the following programs section.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers, in addition to its military construction responsibilities, is engaged in a long-range program of civil works planning and construction, according to directives from Congress, to develop the water resources of stream basins in Utah.

The civil works program in Utah includes constructing flood-control projects and multiple-purpose projects, administering laws for the protection and preservation of navigable waters, fighting floods and making emergency repairs, and conducting investigations on all major streams of the State.

Each river basin authorized by Congress for investigation is studied as a unit in developing a comprehensive plan for water resources development. The studies include consideration not only of flood control but also of water conservation, water supply, hydroelectric power, recreational development, fish and wildlife, and navigation.

The Corps regulates floodflows by constructing flood-control reservoirs and levee and channel improvements. In flood-control reservoir projects, floodwaters are stored and later released at nondamaging rates. In levee and channel-improvement projects, sufficient channel capacity to carry peak flows is provided by dredging, clearing, and straightening the waterway; by constructing levees; by providing bypasses; or by some combination of these methods. Flood-control projects have been completed on the Jordan River at Salt Lake City and on the Sevier River at Redmond. Both projects involved channel improvements. A small flood-control project, Big Wash diversion dam and channel, protects Milford and vicinity.

Three other projects have been authorized but construction has not yet begun. These include the Little Dell Dam and Reservoir east of Salt Lake City on Dell Creek, Spanish Fork River channel improvement about 55 miles south of Salt Lake City, and improvements on the Weber River and tributaries.

The Corps conducts navigation improvements which assist the development of waterborne commerce. Such improvements in Utah would involve shallow-draft navigation for recreation on inland waterways. Consideration for such a project currently is being given to Great Salt Lake near Garfield.

The Corps has been authorized to conduct flood-control and navigation investigations on the Bear River drainage area, Colorado River above Lee Ferry, Mill and Pack Creeks at Moab, Price River basin, Great Salt Lake near Garfield, Jordan River basin, Sevier River, and Virgin River.

The Bureau of Reclamation of the Department of the Interior has requested the Corps of Engineers to evaluate the flood-control aspects of various Reclamation projects under consideration in Utah. The Corps is responsible for formulating rules for the use of space allocated to flood control at all reservoirs constructed wholly or in part with Federal funds. In this way the Corps cooperates with the Bureau of Reclamation in developing plans for the utilization of Utah's water.

Further information on Corps of Engineers projects in Utah will be found in a booklet entitled "Water Resources Development by the U.S. Army Corps of Engineers in Utah" which can be obtained from the Division Engineer, U.S. Army Engineer Division, South Pacific, Corps of Engineers, 630 Sansome Street, San Francisco 11, Calif.

Powder snow skiing in Utah is the rule above the 7,000-foot level and Alta in the Wasatch National Forest is no exception.

Forest Service

In addition to administering Utah's nine National Forests, the Department of Agriculture's Forest Service cooperates with the Utah State Forester in seeking better management and protection of State and private forest lands. The other major part of the Forest Service program is participation in needed research activities through the Intermountain Forest and Range Experiment Station, which has its headquarters at Ogden, Utah.

National Forest lands are managed for the multiple use and sustained yield of their many resources, including timber, range, recreation, water, and wildlife.

Lumbering is of course one of the major uses of the State's forests. In a recent year timber cut from National Forests in Utah totaled 53,852,000 board feet and was valued at nearly $300,000.

Range lands in National Forests are utilized as supplemental grazing for livestock by the State's farmers and ranchers. More than 100,000 cattle and horses and over 400,000 sheep and goats grazed on National Forest lands in a recent year.

With the importance and diversity of National Forest resources increasing rapidly, management and protection activities have been stepping up accordingly. In 1961, the Forest Service announced the following long term projects for Utah: planting 47,000 acres in trees and improving stands of growing trees on 363,000 acres; constructing more than 2,000 campgrounds and picnic sites; range revegetation of 625,000 acres and erosion control work on 183,000 acres; constructing 25 pollution control and flood prevention projects and 825 water holes; building 400 miles of firebreaks; constructing more than 2,000 miles of multipurpose roads and over 450 miles of trails.

The Forest Service works with State agencies on many programs designed to improve protection and management of State and privately owned lands. These programs include fire control, forest pest control, watershed protection and flood prevention, distribution of tree seedlings for planting, and aid to small landowners in forest management. All such programs are administered by the State Forester with Forest Service assistance largely in financing.

At field locations in Ephraim, Logan, and Provo, the Intermountain Forest and Range Experiment Station conducts research in silviculture, pest control, forest economics, recreation, forest engineering, wildlife habitat, range and watershed management, and forest fire control.

Studies of forest regeneration, emphasizing planned harvest cutting in forests containing native trees, have been in progress for more than 20 years in Utah. The Intermountain Station is also responsible for the continuous timber survey of the eight Mountain States and South Dakota.

Of particular benefit to Utah has been the Forest Service's watershed management research. The watershed rehabilitation and resulting flood prevention along the Wasatch Front in Davis County illustrate the great value of this research.

In the late 1800's and early years of this century, overgrazing and fires in the highlands had removed much of the protective vegetative cover, leading to serious flooding. After particularly severe floods in 1923 and 1936, slopes of the Wasatch Mountains above Davis County were replanted in grass and given land treatment to insure growth of the vegetation. Results in flood prevention were immediate and since the 1930's Davis County has been an outstanding example of watershed management and research.

Additional information on programs of the Forest Service can be obtained by writing the U.S. Forest Service, Forest Service Building, Ogden, Utah.

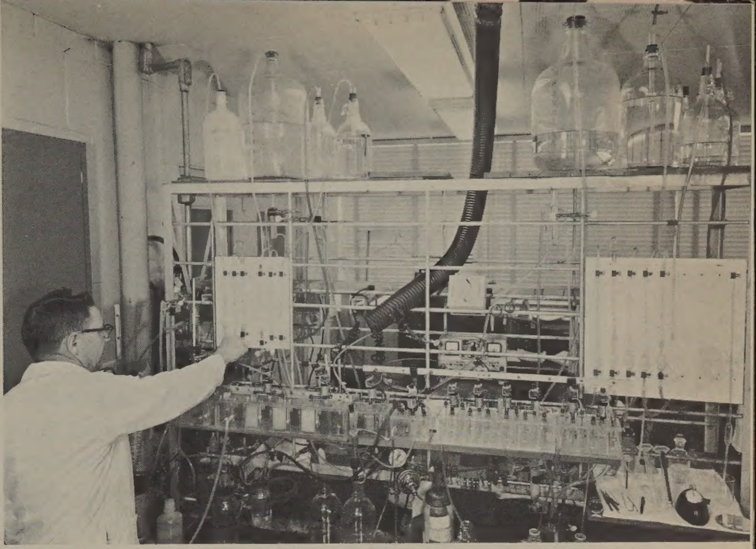
Office of Minerals Exploration

Utah mining interests have participated actively in the exploration assistance program for minerals which was introduced in 1951 under the Defense Minerals Exploration Administration and has been continued since 1958 under the Office of Minerals Exploration in the Department of the Interior.

During the first twelve years of this program, exploration work valued at more than $8 million has been authorized on 106 projects in Utah on which the Federal Government has invested $3.5 million.

Discoveries have been certified on forty-nine of these projects. The principal minerals sought have been beryl, copper, lead, manganese, thorium, tungsten, uranium, and zinc.

Under this program, the Federal Government assists private industry in domestic minerals exploration by paying 50 percent of the cost of approved exploration work. Information about this program can be obtained by writing to the Field Officer, Office of Minerals Exploration, Region III, Building 20, Denver Federal Center, Denver, Colo. 80225, or to the Director, Office of Minerals Exploration, Department of the Interior, Washington, D.C., 20240.



The rare elements thorium and yttrium are recovered from special solutions with this equipment at the Salt Lake City Metallurgy Research Center of the Bureau of Mines.

Bureau of Mines

The Bureau of Mines of the Department of the Interior has long been active in mineral-rich Utah. Since 1913 it has maintained a major research installation at Salt Lake City and has worked throughout the State, cooperating with State agencies and industry in research and helping to improve the safety and health of Utah's mineral industry employees.

In its half-century of existence the Salt Lake City Metallurgy Research Center has achieved a national reputation for excellence in metallurgical research. Through studies in the various fields of metallurgy, the Bureau has pioneered many advances in the processing technology of metal- and mineral-bearing ores. Among its accomplishments are the development of improved methods for concentrating, leaching, smelting, and refining copper, lead, zinc, molybdenum, beryllium, iron uranium, vanadium, phosphate rock, and such rare and new metals as rhenium and scandium.

Producers of copper have particularly benefited from metallurgical studies leading to improved techniques for refining blister copper, smelting cement copper, and producing copper powders. Future advances are promised by Bureau experimentation with an electrolytic process for obtaining finished copper directly from concentrates, without smelting.

Bureau metallurgists have worked out methods for recovering valuable beryllium metal from low-grade deposits in the Spor Mountain area. They also have improved a process for recovering rhenium—a metal with promising applications in electronics and in the development of superior alloys—from plentiful molybdenite concentrates.

Metallurgical research is also underway on uranium and vanadium. Bureau scientists are seeking ways to treat low-grade uranium ores economically, and additional studies are aimed at developing methods for recovering other valuable minerals, now lost in uranium mill wastes. Bureau-developed techniques for recycling uranium mill-waters are being applied by industry to help minimize pollution of Utah's streams. Research is being conducted on vanadium, a byproduct of Utah's uranium production, to produce a metal of high ductility.

In research related to Utah's mining industries, the Bureau of Mines is seeking to apply statistical analysis and computer techniques to problems in estimating ore reserves and developing safe and efficient mines. Bureau's scientists have also developed an explosively anchored rockbolt which, by supporting weak formations more effectively than conventional bolts, may permit development of mineral deposits previously considered too costly to mine.

Bureau research has aided petroleum conservation by developing knowledge of the properties and composition of crude oils found in the Greater Aneth reservoirs of southeastern Utah. This information is useful to State authorities in establishing criteria for well spacing and in regulating oil production for maximum recovery.

Bureau investigations are also constantly providing new information on the richness and extent of oil shale deposits of the Green River formation in the Uintah Basin. This resource is expected to one day become the basis of a great new industry in the West.

Cooperative studies by the Bureau of Mines with other Federal agencies have benefited Utah's farmers by developing a low-cost procedure for treating clays used in lining irrigation canals. As a result of the new treatment, the clays reduced the amount of water lost from the canals through seepage.

By defining the physical and chemical properties of many of Utah's coals, the Bureau has provided guides to their most effective use. Research has indicated the possibility of treating coal from Carbon County to produce metallurgical coke—a commodity that in the past has been brought from the East in large quantities at considerable expense.

Greater safety for workers in Utah's mineral industries is also a prime concern of the Bureau of Mines. Bureau engineers have traveled to every mining district in the State, investigating accidents and training thousands of miners and mine officials in first aid, accident prevention, and mine rescue techniques. Federal inspectors, employed by the Bureau, periodically visit each of the State's coal mines to observe working conditions. Their reports to management officials suggest possible mine improvement measures designed to promote the health and safety of mine employees.

Additional information on the minerals of Utah and the activities of the Bureau of Mines in the State can be obtained from the Salt Lake City Field Office, Area V Mineral Resource Office, 1600 East 1st South Street, Salt Lake City, 84112.

Geological Survey

The Department of the Interior's Geological Survey carries out a variety of programs in Utah including geologic and topographic mapping, classifying mineral deposits, supervising mineral leases, investigating water resources and making studies which add to knowledge of the earth's structure.

Geological Survey scientists conduct a large number of geologic, geophysical, and geochemical studies, many on the actual sites of mineral deposits, attempting to increase knowledge of Utah's lands and minerals. They also make geological investigations which provide valuable data for engineering construction and urban development. This data, by identifying regions of potential landslides, for example, is useful in solving land-use problems too.

Topographic maps, prepared and published by the Geological Survey, graphically show the contour of Utah's land surface, water features such as lakes and river, and man-made features such as roads, boundaries, and cities. The State is covered by 1:250,000-scale series (1 inch represents about 4 miles) of topographic maps which are revised periodically. Two more detailed topographic maps in different scales cover about 55 percent of the State and much of the remainder is currently being mapped.

Geologic mapping—charting the location, structure, and type of rock masses found in a certain region—has been extensive in Utah. Twelve geologic mapping projects are underway while the results of a previous geologic mapping of the Colorado Plateau region are being compiled on a scale of 1 inch representing about 4 miles.

In addition to providing a better understanding of regional geology, geologic mapping determines the location and characteristics of mineral deposits which may be subject to lease by the Federal Government. Geological Survey also supervises more than 26,000 oil and gas leases in Utah, which cover about 14 million acres of public, acquired, and Indian land. Annual value of production from these leases exceeds $100 million, and the annual royalty returns are nearly $13 million.

In its water resources investigations, the Geological Survey determines the chemical and physical composition, distribution, and seasonal variations of both surface and underground water in Utah. Scientists collect basic data on streamflow from about 200 different sites; they also maintain several water sampling stations throughout the State. Ground-water levels are continuously observed at a number of wells. Appraisals of ground-water quality and conditions are underway in many of Utah's valleys, deltas, and basins as well as in the Price, Utah, and Sevier Deserts. The Geological Survey conducts many of its water studies in cooperation with State and other Federal agencies.

Information on the various geologic and topographic maps, mineral resources maps, water resources reports, and other geological survey publications relating to Utah can be obtained by writing the Director, Geological Survey, Department of the Interior, Washington, D.C., 20240.

Because of the increased interest in fishing, the Fish and Wildlife Service has inaugurated a research program to discover ways to keep fishery reserves up to maximum capacity.

Fish and Wildlife Service

The Department of the Interior's Fish and Wildlife Service consists of the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. In addition to managing the national fish hatchery and three national wildlife refuges described in an earlier chapter, the Service conducts numerous other programs and studies contributing to the conservation and development of Utah's fish and wildlife resources.

Under the Fish and Wildlife Coordination Act, the Service coordinated fish and wildlife development with other features of Federal water resource projects. The Bureau of Sport Fisheries and Wildlife conducts studies and prepares reports on projects of the U.S. Army Corps of Engineers, the Department of the Interior's Bureau of Reclamation, and the Department of Agriculture, and also investigated projects of other organizations developed under Federal license or permit.

Some of the fish and wildlife measures proposed for various water resource projects in Utah include land acquisition for development as habitat for waterfowl, upland game birds, and big game; fish stocking and management; and provision of access roads and boat-launching ramps.

Substantial acreages of big-game habitat have already been developed to replace winter ranges inundated by the impounded waters of Flaming Gorge, Central Utah, and Emery County Reservoirs. Manmade habitat has also been developed for waterfowl resources, formerly dependent on areas maintained by periodic natural overflows.

The Bureau of Sport Fisheries and Wildlife and the State fish and game agencies have undertaken a variety of projects to protect and improve conditions for fish and wildlife in the vicinity of the Colorado River Storage Project. For example, the Bureau is building a large national fish hatchery in Uintah County on Jones Hole Creek near its confluence with the Green River. When completed, this hatchery is expected to produce more than 300,000 pounds of trout annual for stocking project waters.

Both Bureau and State biologists are conducting biological, ecological, and other scientific studies at newly developed reservoirs to determine the most effective methods of management to sustain the finest possible fishing for the State's residents and visitors.

A cooperative fishery unit at Utah State University, under the guidance of representatives of the University, State Department of Fish and Game, and the Bureau of Sport Fisheries and Wildlife, is providing training to graduate students in fishery science. Students pursue studies related to the fishery resources of the Green River and Flaming Gorge Reservoir, life histories of important fish, aquatic environment, and survival of hatchery fish under natural stresses.

As part of their fishery management services, the Bureau of Sport Fisheries and Wildlife conducts fishery surveys on Federal areas in the State, and coordinates fishery activities on Federal areas with those of the State Game and Fish department in the immediate vicinity. Fishery management services are also carried out at national wildlife refuges, on the Uintah and Ouray Indian reservation, and several military bases.

The Bureau's wildlife management programs include predatory animal and rodent control. The Bureau also maintains four game management agents in the State (two at Salt Lake City, one at Brigham City, and one at Richfield) who enforce Federal conservation laws and conduct field activities in the migratory bird management program. They cooperate with the Utah Fish and Game Department in their enforcement and management work.

Utah's Federal aid funds for fish and wildlife restoration have been used to acquire big game ranges and waterfowl habitats, develop and maintain waterfowl areas, construct fishing lakes, revegetate depleted big game ranges, conduct game trend and harvest surveys, and conduct research on wildlife management programs.

The service's Bureau of Commercial Fisheries conducts consumer education programs in Utah to develop new markets for fishery products produced in all sections of the country. Although the Bureau does not maintain a marketing office in Utah, it serves the State from the Terminal Island, Calif., office.

Further information on the activities of the Fish and Wildlife Service in Utah can be obtained from the area supervisor of the Branch of River Basin Studies, Federal Building, Salt Lake City, Utah.

Bureau of Land Management

The Department of the Interior's Bureau of Land Management administers approximately 46 percent of the total land area in Utah. This amounts to 24,864,089 acres, about two-thirds of all Federally administered lands in the State.

Bureau of Land Management activities in Utah are directed from the State Office located in Salt Lake City, and from district offices in Brigham City, Murray, Fillmore, Cedar City, Richfield, Monticello, Price, Vernal, and Kanab. Status records for Federal lands in Utah are maintained at Salt Lake City.

Management of the public domain in Utah requires that the lands be described in small, readily identifiable units. The Bureau of Land Management accomplishes this by land ownership surveys. Some 44 million acres of Utah's 52,696,960 acres of land have already been surveyed. In recent years, use of modern equipment has enabled the Bureau to accelerate this work. Helicopters now transport survey crews within minutes to areas once considered almost inaccessible.

Conservation is a guiding concept in the Bureau's program for managing carefully the renewable resources on the public lands in Utah. Bureau of Land Management's conservation programs are concerned with fire protection; management of

The protection and development of 24.8 million acres of public-domain lands in Utah is the major responsibility of BLM.

grazing and timber harvesting; planting or reseeding to improve timber stands or range cover; control of noxious weeds, timber diseases, and insect pests; and erosion control.

The Bureau of Land Management's accomplishments in Utah include building 8,000 check dams to decrease run-off in gullies and canyons; putting up 4,000 miles of fencing; reseeding approximately 200,000 acres of land; constructing nearly 2,000 reservoirs; treating approximately 50,000 acres for weed control; building more than 2,500 miles of truck trails on public lands, and establishing 150 spring developments and 150 wells.

Management of the public land in Utah is carried out by the Bureau of Land Management under authority of several public land laws passed by Congress. Livestock grazing on public lands is administered under provisions of the Taylor Grazing Act of 1934 and other related laws. The mining laws provide either for ownership, through patenting of valid mining claims, or for the right to extract minerals from unpatented claims. The Small Tract Act and the Recreation and Public Purposes Act provide for the transfer of land out of Federal ownership for various uses.

Public domain lands for many years have been used for outdoor recreation. Until recently, however, adequate facilities for recreation have been lacking. As a result of increased need and interest in recreation facilities during recent years, the Bureau of Land Management has cooperated with Federal, State, and local agencies in planning and constructing recreation sites. Some sites—including Kodachrome Flats, Dixie State Park, and Valley of the Goblins—have been transferred to the State for development. In other major areas, such as the Canyonlands National Park and the huge recreation areas created by the construction of Flaming Gorge and Glen Canyon Dams, the Bureau of Land Management has worked closely with other Federal agencies in developing the recreation potential.

Bureau of Land Management administration of public lands in Utah channels several million dollars a year into the public treasuries. Of the total receipts, a percentage—amounting to nearly $6 million in a recent fiscal year—is turned over to the State and used, according to State law, principally for the operations of public schools.

Additional information about public lands and activities of the Bureau of Land Management in Utah is available from the BLM State Office, Darling Building (P.O. Box 777), Salt Lake City, 84110.

Bureau of Reclamation

The Department of the Interior's Bureau of Reclamation works to achieve the wisest possible development and utilization of Utah's water resources. The Bureau's efforts to solve the State's water problems have resulted in many noteworthy accomplishments. The Strawberry Valley Project, the first Federal Reclamation project built in Utah, was begun in 1905, and since then eight other projects have been completed. The primary purpose of these projects is to supply Utah's already irrigated farms with the supplemental water they vitally need to sustain crop growth.

Reclamation projects have significantly aided the agricultural sector of Utah's economy and still greater benefits are expected from projects currently underway. The Bureau of Reclamation's Weber Basin Project, for example, by storing and regulating practically all the flows of the Weber River, will eventually bring supplemental water to about 70,000 acres of presently irrigated farms and full water supplies to over 40,000 acres of presently unirrigated lands. Two proposed projects, one on Bear River and the Dixie Project on the Virgin River, would provide further water to relieve other irrigation shortages.

But irrigation is by no means the only use for water in Utah. Following World War II, Utah's economy rapidly turned industrial with the result that large areas of irrigable farmland, especially along the Wasatch Front, were developed into urban and commercial centers. The State's water requirements reflected this economic shift, and the Bureau of Reclamation recognized the necessity of meeting new municipal and industrial needs. Today, nearly one-half million people in Utah get all or part of their municipal and industrial water from Reclamation projects. The Weber Basin Project, for example, in addition to supplying irrigation water to farms, provides Utah with an important municipal and industrial water service which will become even more extensive when the project is completed. Completion of this project will allow maximum utilization of the water resources available in the Weber River drainage area. If constructed, the Bear River Project and the Dixie Project would also furnish Utah's cities and factories with water.

By far the most important of Utah's Reclamation projects is the Central Utah Project which, except for the small operating Vernal Unit, is in the early planning stage. The $300 million initial phase of the Project, actually a participating segment of the Colorado River Storage Project, will bring supplemental irrigation and municipal and industrial water to a large area in central Utah, including the heavily populated Salt Lake and Utah Counties. Supplemental water will be delivered to about 113,000 acres of presently irrigated, but water-short farmland. More than 40,000 acres now unirrigated will receive a full water supply. In addition, this initial phase will develop enough municipal and industrial water annually to support an additional population of 320,000 people in Utah and supply them with over 3 billion kilowatt-hours of electric energy. It is no exaggeration to say that construction of the initial phase of the Central Utah Project will vitally benefit Utah's future economic growth.

But the initial phase of the Central Utah Project is only the first step toward the ultimate goal of developing a major part of Utah's share of water from the Colorado River. In the final stage, a tunnel would be constructed beneath the Uinta Mountains to channel water of the Green River, a major tributary of the Colorado, from Flaming Gorge Reservoir to the Uinta Basin. Studies of the feasibility of this stage of the project are underway.

Additional information on Federal Reclamation projects in Utah can be obtained from the Regional Director, Bureau of Reclamation, Box 11568, Salt Lake City.

Students at a workshop in an Indian school use a tape recorder as part of their training in the English language.

Bureau of Indian Affairs

In addition to resource conservation and development work on Indian land, the Department of the Interior's Bureau of Indian Affairs assists Indians of Utah in other forms of economic development and provides them with community services in the fields of education, welfare, employment assistance, and law enforcement.

Although Utah has assumed responsibility for educating its Indian citizens, the Bureau of Indian Affairs operates three schools and a dorminatory for Navajo children from isolated areas. The Intermountain Boarding School at Brigham City enrolls over 2,000 Navajo pupils from Arizona, New Mexico and Utah who lack adequate educational opportunities on the reservation. Although this school was initially established for over-age Navajo youth with little or no education, its program has been modified through the years to serve the changing needs of students. It now includes elementary and secondary grades as well as special accelerated courses required by over-age, undereducated children. Students who remain at the Intermountain school during the summer months enjoy a special program involving educational trips, student employment, and recreational activities.

Two other boarding schools serve the needs of Navajo children on the Utah portion of the reservation, and a Bureau-operated dormitory at Richfield provides boarding accommodations for Navajo pupils attending local public schools. Two school districts—Uintah and Sevier—enroll Indian children from nontaxable lands since they receive financial assistance for the purpose from the Bureau of Indian Affairs.

The Bureau conducts a welfare program on the Uintah and Ouray Reservation and on the Utah portion of the Navajo Reservation. On the latter reservation, general assistance is provided to needy Indians who do not meet eligibility requirements for public assistance (Old Age Assistance, Aid to

Dependent Children, Aid to the Blind, and Aid to the Totally and Permanently Disabled). There is also a tribal welfare program on the Navajo Reservation which offers emergency assistance, school clothing, work projects, and certain medical needs. On the Uintah and Ouray Reservation, the tribe provides general assistance from tribal funds. Child welfare services are available on both reservations, as are social services, which include advice and counsel to Indians in planning constructive use of their own funds. The latter has been a particularly important activity on the Uintah and Ouray Reservation.

The Bureau of Indian Affairs helps eligible Indians achieve self-sufficiency through employment. Because many adult Indians lack the skills needed to obtain gainful, steady employment, the Bureau helps them to get necessary vocational training, and, in certain instances, on-the-job training in manufacturing plants on or near reservations. At the Uintah and Ouray Agency at Fort Duchesne and at the Intermountain Indian School, the Bureau assists Indians in obtaining temporary and seasonal employment.

In Utah, the State does not have jurisdiction over crimes committed by Indians on the reservations. Most major offenses involving Indians on reservations, as defined by the special or general laws of the United States, are subject to Federal jurisdiction. Most lesser offenses by Indians are tried in the local Indian courts. The Bureau of Indian Affairs assists tribes in their local law enforcement programs.

Additional information on Indians and reservations in Utah and the activities of the Bureau of Indian Affairs can be obtained by writing the Phoenix Area Office, Bureau of Indian Affairs, 124 W. Thomas Road, Phoenix, Ariz., 85011, or the Uintah and Ouray Agency, Bureau of Indian Affairs, Fort Duchesne, Utah, 84026.

Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation in the Department of the Interior administers a program of grants-in-aid available to all States for outdoor recreation planning, acquisition, and development. Authorized by the Land and Water Conservation Fund Act of 1965, this program provides Federal matching funds for State and local outdoor recreation projects. The Land and Water Conservation Fund derives moneys from "pay-as-you-go" user fees and entrance charges at Federal recreation areas, sale of surplus Federal property, a Federal tax on motorboat fuels, and advance appropriations.

The Bureau of Outdoor Recreation provides technical assistance to Utah and other States in statewide planning necessary for State participation in the 50–50 matching fund program. These plans provide guidelines for future outdoor recreation developments by individuals, private organizations, cities, counties, and various units of the State government.

Chief duties of the Bureau of Outdoor Recreation are to cooperate with the States on outdoor recreation matters, promote coordination in Federal outdoor recreation programs, administer the grants-in-aid program, and develop a long-range, continuing nationwide outdoor recreation plan based on State, Federal, regional, local, and private plans. The Bureau manages no lands or recreation facilities.

The Governor of Utah has designated the State Planning Coordinator to serve as Liaison Officer for the State in working with the Bureau of Outdoor Recreation.

Additional information on the Bureau may be obtained from the Regional Director, Mid-Continent Region, Bureau of Outdoor Recreation, 7860 West 16th Avenue, Denver 15, Colorado.

National Park Service

At Dinosaur National Monument visitors can view embedded fossil bones of prehistoric creatures and watch scientists at work recovering remains.

The Department of the Interior's National Park Service administers national parks, national monuments, national historical sites, and national recreation areas, all of which were described earlier under "Outdoor Recreation". With its long-range development program, the National Park Service will continue improving these areas wherever possible by building more campsites, picnic grounds, overnight accommodations, trails, and other recreation facilities. Additional interpretive talks and guided tours of historic, scenic, and scientific sites are also planned.

Excavation and stabilization of the ruins at the Square Tower House Group in Hovenweep National Monument is continuing to open more of these historic ruins to the public. Reliefing of fossils at the Quarry at Dinosaur National Monument is also scheduled to go on. In addition, new roads will be constructed at the Quarry-Blue Mountain and Harpers Corner areas, and a new campground built near Green River. The campground at Zion National Park will be expanded and more overlooks to view Zion's fantastic erosion formations will be provided. A new road from Lee Pass to Overlook parking area is planned; a spur will be extended to the parking area below Tucupit Point. A visitor center is being built at Capitol Reef.

Over the next few years, significant developments will take place at Glen Canyon National Recreation Area. At Rainbow Bridge Landing in the Glen Canyon area, where Lake Powell is confined between the high, sheer walls of a canyon, floating installations including a dock, park ranger station, marine fueling station, and a refreshment stand will be built. Also planned is a floating walkway and water access to the previously almost inaccessible Rainbow Bridge National Monument.

Other plans for the Glen Canyon area include building more camp and picnic grounds, a campfire circle or ampitheater, marinas, dining and overnight accommodations, stores, service stations, roads, and trails.

Two national recreation areas and a national monument have been proposed for addition to the National Park System in Utah. Proposed Flaming Gorge National Recreation Area, which would be jointly administered by the National Park Service and the Department of Agriculture's Forest Service, would include the 91-mile long reservoir formed by Flaming Gorge Dam and the spectacular Flaming Gorge and Red Canyon, both carved in the Uinta Mountains by the Green River. Boat launching ramps and access road have already been constructed for the reservoir at Lucerne Valley and Antelope Flat, two areas to be further developed in the near future. Plans include starting a ferry service to connect the two areas and building camp and picnic grounds, trailer parks, dining and overnight accommodations, service stations, stores, roads, trails, a campfire circle or amphitheater, and a marina.

Another proposal would establish a large part of Antelope Island and the immediately surrounding waters of the Great Salt Lake as the Great Salt Lake National Monument.

Additional information on programs of the National Park Service and areas administered in Utah can be obtained from the headquarters at the Department of the Interior, Washington, D.C., 20240.

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The State Resources Series

The "Natural Resources of Utah" is one of a series of publications on the various States. Similar booklets on the States of Colorado, Idaho, Montana, Oregon, New Mexico, Washington (each 50 cents), Arizona, Ohio, Massachusetts, Nevada, and West Virginia (each 45 cents) are also for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

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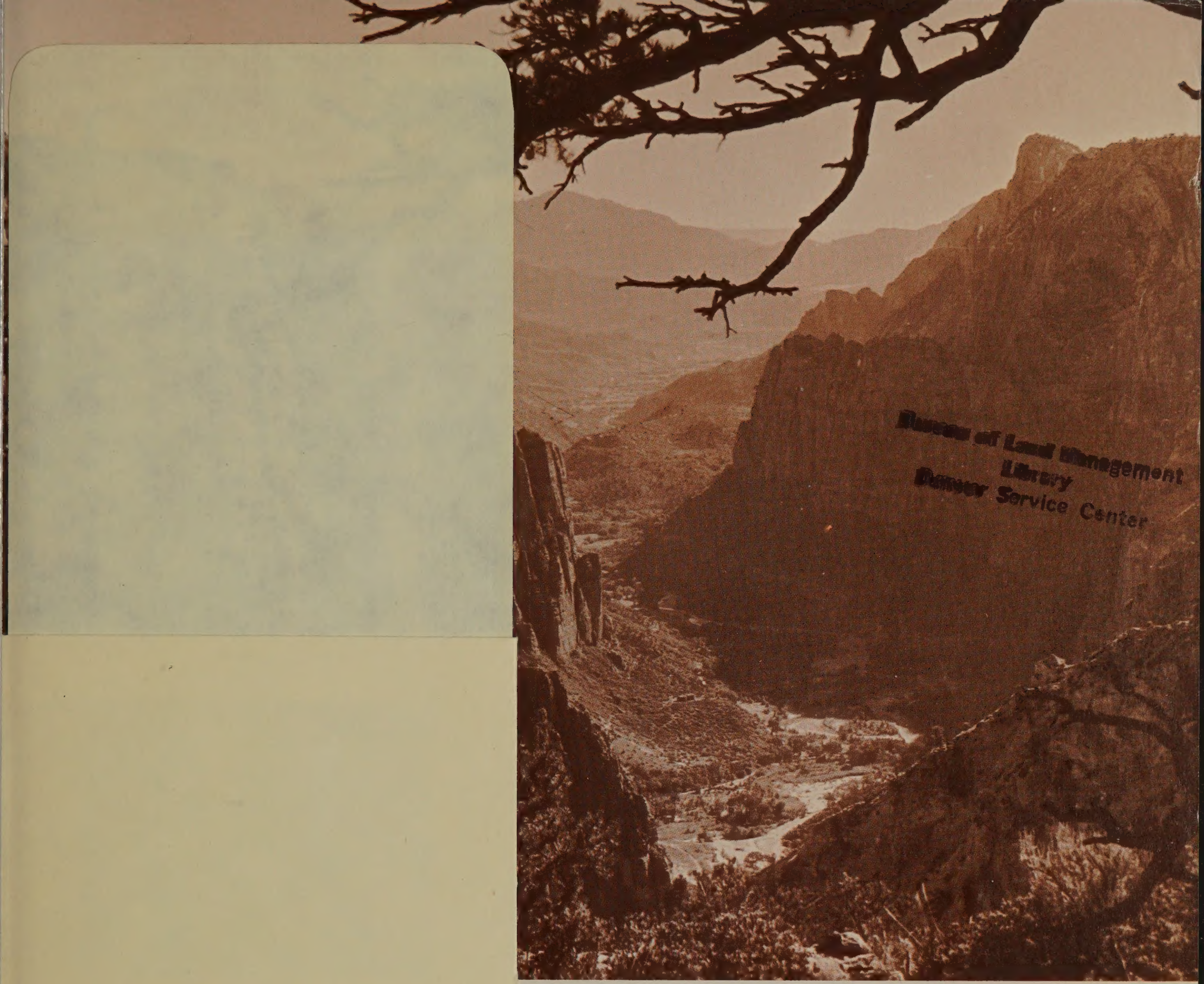
For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402 - Price 45 cents

(front cover) Scenic Alpine drives wind along through Utah's pinon pines and past gently rolling mountains and foothills.

(back cover) Rainbow Bridge, one of the Nation's greatest monuments, is a blend of color, grace and massive strength.



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The Future

A wealth of land, water, mineral, fish and wildlife resources support Utah's vigorous economy and thriving industries. The State is blessed with an array of scenic wonders and great recreational assets which are just beginning to be tapped.

From the days of the pioneers, Utah's people have shown a dynamic responsibility in protecting and developing their resource heritage. Utahans learned early the necessity for wise use of water to make the land rich and productive, and they have been both conscientious and creative in their efforts to insure adequate supplies of this resource.

This combination of a resource-conscious people and a resource-laden land has spurred Utah's progress in the past and will sustain the State's growth in the years to come. Natural resource agencies of the Federal Government will continue to work with local and State agencies for the future well-being of the Beehive State.

THE GREAT SEAL OF THE STATE OF UTAH

INDUSTRY

1847

1896

Created in 1849, the Department of the Interior—a Department of Conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

March 3, 1849